MAINVIEW® for IMS Offline Performance Reporter

Reference Manual

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United States and Canada

Address BMC Software, Inc.
2101 CityWest Blvd.
Houston TX 77042-2827

Telephone 713 918 8800 or
800 841 2031

Fax 713 918 8000

Outside United States and Canada

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Before Contacting BMC Software

Before you contact BMC Software, have the following information available so that Customer Support can begin working on your problem immediately:

- product information
  - product name
  - product version (release number)
  - license number and password (trial or permanent)
- operating system and environment information
  - machine type
  - operating system type, version, and service pack or other maintenance level such as PUT or PTF
  - system hardware configuration
  - serial numbers
  - related software (database, application, and communication) including type, version, and service pack or maintenance level
- sequence of events leading to the problem
- commands and options that you used
- messages received (and the time and date that you received them)
  - product error messages
  - messages from the operating system, such as `file system full`
  - messages from related software

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About This Book

This book describes how to use the Performance Reporter, a MAINVIEW® for IMS Offline component.

This book is intended for

- IMS system and database administrators who capture and review the activity of each day's IMS session
- system programmers who isolate recurring problems in the IMS environment
- data center managers who make hardware and resource acquisition decisions based on long-term trends

Before using the Performance Reporter, you must be familiar with the MAINVIEW for IMS Offline environment (described in the *MAINVIEW for IMS Offline – Customization and Utilities Guide*), the IBM® OS/390 batch job execution, and the IBM IMS program product.

For information about new features in the current release of MAINVIEW for IMS Offline, see the product release notes, which are available on the BMC Software Support Web pages.

Note: Although MAINVIEW for IMS is often referred to as "MVIMS" in this book, the abbreviation is used for brevity only and does not represent a legal product name of BMC Software.

How This Book Is Organized

The organization of this book is described in the table below.

Chapter/Appendix	Description
Chapter 1, “Introduction”	describes how Performance Reporter works
Chapter 2, “Event Collector Options”	describes the Event Collector parameters needed by Performance Reporter to produce reports from the IRUF file
Chapter 3, “Total IMS Resource Usage Analysis Report (TASCOSTR)”	describes the TASCOSTR report, which quantifies dynamic resources consumed for the total IMS system
Chapter 4, “Message Region Utilization Analysis Reports (PRSREGUT)”	describes the functions and layout of the PRSREGUT report and provides examples
Chapter 5, “Program Processing Reports (PRSPSBRP, PRSPSB20)”	describes the functions and layout of the PRSPSBRP and PRSPSB20 reports and provides examples
Chapter 6, “Transaction Processing Reports (PRSTRN10, PRSTRNFP, PRSTRND2)”	describes the functions and layout of the PRSTRN10, PRSTRNFP, and PRSTRND2 reports and provides examples
Chapter 7, “General Activity Analysis Reports (PRSACTIV)”	describes the functions and layout of the PRSACTIV reports and provides examples
Chapter 8, “Graphical Analysis Reports (PRSPLT00)”	describes the functions and layout of the PRSPLT00 reports and provides examples
Chapter 9, “Transaction Response Reports (PRSRESP)”	describes the functions and layout of the PRSRESP reports and provides examples
Chapter 10, “Calendar Reports (PRSCLNDR)”	describes the functions and layout of the PRSCLNDR reports and provides examples
Appendix A, “How Product Libraries Should be Used”	describes how to use distributed and customized parameter, sample, and profile libraries

MAINVIEW Product Documentation

MVIMS is integrated with the BMC Software MAINVIEW® architecture. MAINVIEW is a base architecture that allows authorized users to use a single terminal to interrogate any OS/390, CICS, IMS, DB2, or MQSeries subsystem in a sysplex.

This section lists the documents specific to MAINVIEW for IMS products and the documents that provide information common to many MAINVIEW products.

MVIMS Product Library

The MVIMS product library includes the following books.

MAINVIEW for IMS Offline

MAINVIEW for IMS Offline – Customization and Utilities Guide

MAINVIEW for IMS Offline – Performance Reporter Reference Manual

MAINVIEW for IMS Offline – Transaction Accountant Reference Manual

MAINVIEW for IMS Offline – Release Notes

MAINVIEW for IMS Online

MAINVIEW for IMS Online – Customization Guide

MAINVIEW for IMS Online – IPSM Reference Manual

MAINVIEW for IMS Online – Analyzers Reference Manual

MAINVIEW for IMS Online – Monitors and Traces Reference Manual

MAINVIEW for IMS Online – Release Notes

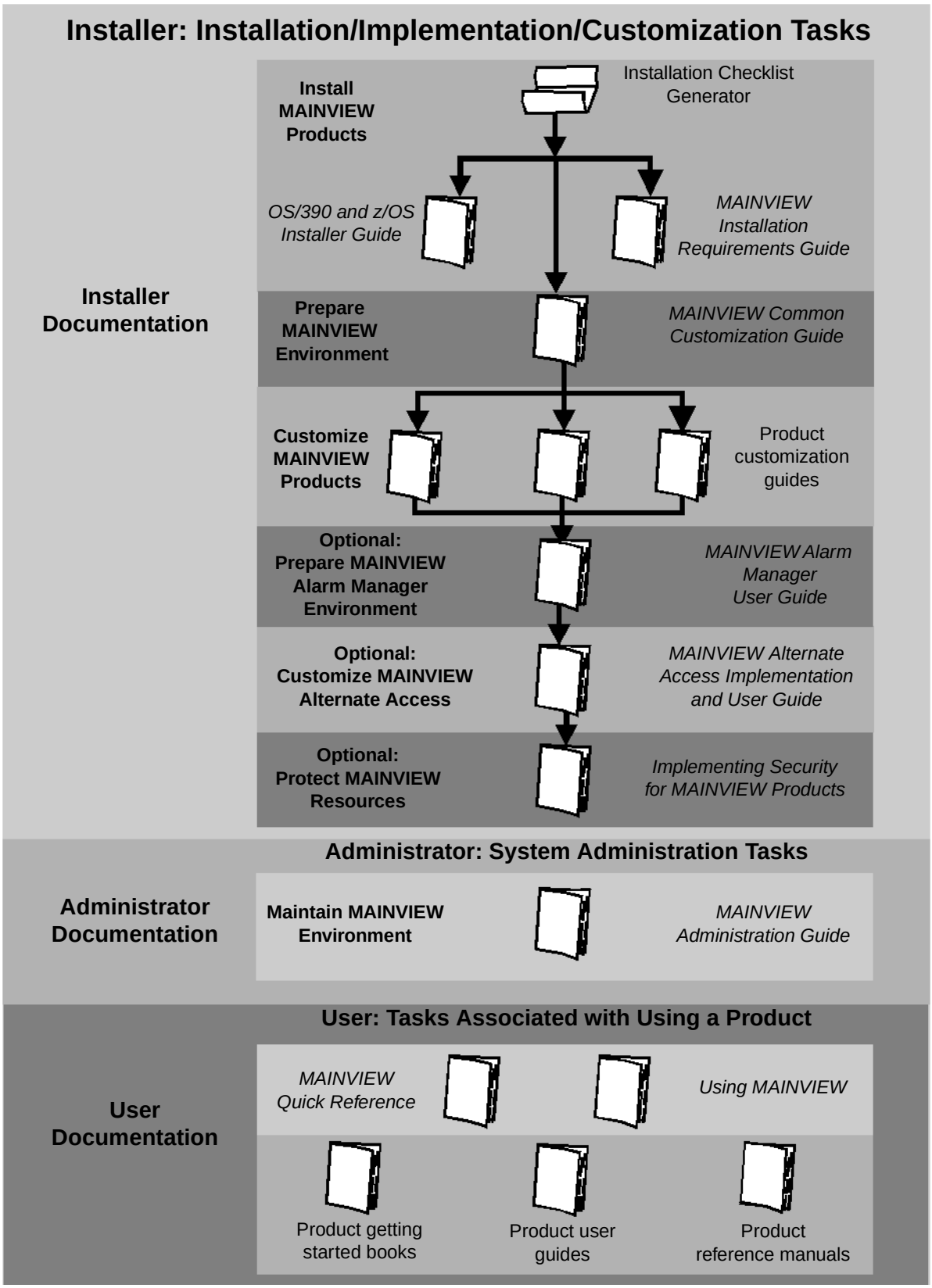
MAINVIEW Product Family Documentation

The books and quick references that provide general information common to many MAINVIEW products are listed and described in the following table.

OS/390 and z/OS Installer Guide	provides information about the installation of BMC Software products on OS/390 and z/OS systems
MAINVIEW Installation Requirements Guide	provides information about installation requirements such as software requirements, storage requirements, and system requirements
MAINVIEW Common Customization Guide	provides instructions for manually customizing the MAINVIEW environment for your products
MAINVIEW Alarm Manager User Guide	explains how to create and install alarm definitions that indicate when exceptions occur in a sysplex
MAINVIEW Alternate Access Implementation and User Guide	explains how to configure, start, and stop VTAM and EXCP AutoLogon sessions to access MAINVIEW products without an active TSO subsystem
Implementing Security for MAINVIEW Products	explains basic MAINVIEW security, enhanced security, and MAINVIEW Alternate Access security
MAINVIEW Administration Guide	provides information about MAINVIEW operations, targets, single-system image contexts, MAINVIEW Alarm Manager, data sets, view customization, and diagnostic facilities
MAINVIEW Quick Reference	introduces the MAINVIEW family of products and lists the commands used to manage the MAINVIEW windows environment
Using MAINVIEW	provides information about working with MAINVIEW products in windows mode and full-screen mode

Note: MAINVIEW messages are documented in the Messages and Codes online display, which you can access by typing MSG in the command line of any MAINVIEW display.

The figure on the next page lists the MAINVIEW product documents and shows how they should be used.


Installer: Installation/Implementation/Customization Tasks
Installer Documentation
Install MAINVIEW Products
Installation Checklist Generator
OS/390 and z/OS Installer Guide
MAINVIEW Installation Requirements Guide
Prepare MAINVIEW Environment
MAINVIEW Common Customization Guide
Customize MAINVIEW Products
Product customization guides
Optional: Prepare MAINVIEW Alarm Manager Environment
MAINVIEW Alarm Manager User Guide
Optional: Customize MAINVIEW Alternate Access
MAINVIEW Alternate Access Implementation and User Guide
Optional: Protect MAINVIEW Resources
Implementing Security for MAINVIEW Products
Administrator: System Administration Tasks
Administrator Documentation
Maintain MAINVIEW Environment
MAINVIEW Administration Guide
User: Tasks Associated with Using a Product
User Documentation
MAINVIEW Quick Reference
Using MAINVIEW
Product getting started books
Product user guides
Product reference manuals

Accessing Product Information

The books that accompany BMC Software products are available in online format and printed format. You can also access product information from product release notes and other product notices.

Online Books

Online books are formatted as Portable Document Format (PDF) files. You can view them, print them, or copy them to your computer using Acrobat Reader 3.0 or later. For information about downloading the free reader from the Web, go to the Adobe Systems site at **http://www.adobe.com**.

You can access online books from the documentation CD that accompanies your product or from the Web. To view online books, visit the support pages of the BMC Software Web site at **http://www.bmc.com/support.html**.

Printed Books

A set of printed books is provided with your product order. To request additional books, go to **http://www.bmc.com/support.html**.

Release Notes and Other Notices

Printed release notes accompany each BMC Software product. Release notes provide current information about new and changed product functions.

A product may also have related technical bulletins that are provided between releases. The latest versions of the release notes and technical bulletins are available on the Web at **http://www.bmc.com/support.html**.

Conventions

The following symbols are used to define command syntax, and they should not be included with a command.

- Brackets [ ] enclose optional parameters or keywords.
- Braces { } enclose a list of parameters, one of which must be chosen.
- A vertical line | separates alternative options, one of which can be chosen.
- An underlined parameter is the default.

The following command syntax conventions also apply:

- An ITEM IN CAPITAL LETTERS must be typed exactly as shown.
- Items in *italicized, lowercase* letters are values that you supply.
- When a command is shown in uppercase and lowercase letters, such as **HSplit**, the uppercase letters show the command abbreviation that you can use (**HS**, for example). The lowercase letters complete the command name. Typing the entire command name is an alternative way of entering the command.
- Commands that do not have an abbreviation (**END**, for example) are shown in all uppercase letters.

Chapter 1 Introduction

The Performance Reporter is an MVIMS Offline analysis component that produces reports and plots you can use to evaluate IMS system and application performance. You can use the evaluations for IMS planning, forecasting, and performance management.

The IMS Resource Utilization File (IRUF) is the main source of information for the Performance Reporter. The IRUF is first created by MVIMS Log Edit as a detail file. In other words, there is one record for each transaction or program activity and one record for each logical terminal generated in IMS. (Users have the option of creating the terminal record for each terminal or for only those terminals that have activity. For details, see the LTERMREC input parameter description in the MVIMS Log Edit chapter of the *MAINVIEW for IMS Offline – Customization and Utilities Guide*.)

Input to the Performance Reporter can be IRUF summary files, detail IRUFs, or both.

The IRUF contains data that has been collected and processed by MVIMS. First, the Event Collector captures data on IMS activity as it occurs and writes this information to the IMS system log as MVIMS transaction and program records. (The amount of data collected and stored in the records is determined by several data collection options specified to the Event Collector. More information about these options and the resulting reporting differences is provided in Chapter 2.)

Next, the IMS system log data is processed by the MVIMS batch program IMFLEDIT, which extracts the MVIMS records and some data from IMS log records and stores the data in the detail IRUF. Information in an IRUF can be summarized (by the TASCOSTR program) for a time period; for example, one day. Abstracted data is grouped as follows:

Terminal record	Summarized information for each logical terminal within a customer/user category per summarization period.
Program record	Summarized information for each program within the summarization period (for example, one program accounting record per program per day).
Transaction record	Summarized information for each transaction code within a customer/user category per summarization period (for example, one transaction accounting record per transaction code within a customer/user category).

In the Performance Reporter, TASCOSTR reads IRUF files, summarizes the input data, and stores the data in a summarized IRUF. Input to TASCOSTR can be any combination of IRUFs, either detail, summary, or both.

The Performance Reporter has two utilities, PRSSELEC and PRSPRINT. These utilities are documented in the *MAINVIEW for IMS Offline – Customization and Utilities Guide*. PRSSELEC can be used to extract a subset of data to be processed by the Performance Reporter. PRSPRINT can be used to print IRUFs.

The Performance Reporter user can select options in the following areas:

- Message region utilization
- Program processing statistics
- Transaction processing statistics
- General activity analysis by database and LTERM
- Plotting
- Response reports
- Calendar reports

Chapter 2 Event Collector Options

The Event Collector collects IMS event data that is used by the Performance Reporter and the Transaction Accountant. The data is collected and stored in the IRUF for processing by these batch report programs.

You can specify the amount of data collected and stored in the IRUF with data collection parameters specified to the Event Collector in BBPARM member IMFECP00.

This section describes the Event Collector parameters used by the Transaction Accountant and the Performance Reporter to produce reports from the IRUF file. For more information about the parameters, see the *MAINVIEW for IMS Offline – Customization and Utilities Guide*.

Data Collection Parameters

The following parameters determine the amount of IMS event data collected in the IRUF file for batch report processing:

Dependent Overhead CPU

BILLOVHD=NO | YES | SCHEDDLI

The BILLOVHD parameter determines whether dependent region CPU time is treated as either

- overhead
- chargeable CPU time per user

when the CPU time is spent in

1. prior transaction termination
2. current transaction scheduling
3. program load, if any
4. schedule-to-first DL/I

If BILLOVHD=NO (the default), CPU time spent in items 1 through 4 is treated as overhead.

If BILLOVHD=YES, CPU time spent in items 1 through 4 is charged to the user.

If BILLOVHD=SCHEDDLI, CPU time spent in items 1 and 2 is treated as overhead and CPU time spent in items 3 and 4 is charged to the user.

DBCTL Threads

CICS=YES | ONLINE | OFFLINE | NO

The CICS parameter controls whether records are collected for DBCTL thread data, including ODBA threads. The CPU usage is the same for all options. Usage depends on the number and activity of CICS transaction programs.

BMP and JBP Data

BMP=YES | NO | NOCPU

The BMP parameter controls whether activity data for BMP and JBP transactions and programs is collected. The default is YES, to collect BMP and JBP data.

If BMP or JBP processing is causing bottlenecks in the IMS online system, you may want to avoid the extra overhead that MVIMS monitoring adds. However, this option is viable only if the MVIMS BMP and JBP data is not required for accounting or IMS performance analysis. In general, most sites will want to collect BMP and JBP data.

The effect of this parameter on MVIMS CPU usage depends on the number and activity of all BMPs and JBPs.

Buffer Handler Timing

BHTO=OFF | ON

BHTO controls whether IMS buffer handler activity is included with DL/I CPU or timed separately. The default is to include it with DL/I (BHTO=OFF).

The high ratio of buffer handler calls to application program DL/I calls in IMS makes separate collection of buffer handler CPU very CPU-intensive for MVIMS. The ratio can be as high as 20 to 1, so collecting separate CPU time data for each buffer handler request can become too expensive when compared with the value of the data. Depending on the number of database calls and the amount of buffer handler activity, BHTO=ON can increase MVIMS CPU usage by 20 to 40 percent.

BHTO=ON is provided for product compatibility, but it is not a recommended option.

CPU Data Collection Options

CPU=DEPPGM | DEPDB2 | DEP | ALL | NONE

The CPU parameter controls the level of CPU data collected by the Event Collector.

CPU=DEPPGM causes the Event Collector to time only the dependent region activities. The setting times the entire transaction as a single event and does not time individual DL/I or DB2 calls. The single resulting CPU time (representing all the chargeable time for the transaction) is attributed to application program CPU time. All other chargeable timings are zero. Overhead CPU time, however, is still kept separately.

CPU=DEPPGM offers the biggest overhead reduction, since it times the entire transaction as a single event instead of timing each DL/I and SQL call. However, the amount of overhead saved depends to a large extent on the current transaction processing profiles. For example, a BMP program issuing 10,000 DL/I calls saves more than an MPP program issuing only 10 DL/I calls. However, even when savings from each transaction are small, they add up quickly.

The difference between CPU=DEPDB2 and CPU=DEPPGM is that CPU=DEPDB2 causes the Event Collector to separate the dependent region DB2/SQL time from the application program CPU time.

CPU=DEPDB2 causes the Event Collector to time the DB2 events (SQL calls). As a result, the potential amount of overhead saved from this option is highly dependent on how many SQL calls the transaction/program issues. For example, if an MPP program issues only two DL/I calls and 100 SQL calls, the amount saved is minimal.

CPU=DEP causes the Event Collector to attribute chargeable CPU application program or DL/I processing CPU time to a specific transaction and user. When CPU=DEP is used, Event Collector CPU usage increases 25 to 35 percent, depending on the amount of DL/I activity, over CPU=NONE.

CPU=ALL adds collection of DL/I processing CPU in the control region and measurement of various overhead categories such as program scheduling activity. The setting can increase MVIMS CPU usage by 3 to 12 percent over the CPU=DEP option.

CPU=ALL is the best choice if the various overhead CPU categories are needed for performance analysis or if any of the following are true of the monitored IMS:

- IMS parameter LSO equals Y.
- BMPs or JBPs are run in nonparallel DL/I mode.
- Percentage of message queue DL/I calls compared to database calls is high. (On average, message queue calls are 5 to 15 percent of the total DL/I calls.)

All of these factors increase the amount of IMS CPU incurred in either the control regions or the DLISAS regions.

Database I/O Options

DBIO=IOWAITS | BFALTERS | NONE

DBIO controls the level of database I/O data to be collected by the Event Collector. The DBIO=BFALTERS option collects all database activity indicators at the database level for each transaction.

With the BFALTERS option, reporting can be made by transaction and user and by database, for extended performance analysis. NO I/O counts (the number of reads without I/Os), which show buffer handler activity, can also be collected when BFALTERS is selected. BFALTERS uses an IMS buffer handler interface, which is expensive because of the high ratio of requests to the buffer handler compared with DL/I calls and actual I/O.

DBIO=IOWAITS activates a more efficient method of data collection. DL/I calls are collected by database. I/Os are measured at actual occurrence (using the DC Monitor IWAIT interface) instead of in the buffer handler. With the IWAIT interface, reads and writes that occur during call processing are collected by database, but writes that occur at sync point (the majority) can be associated only with the transaction and user, not with the specific database. Most writes are collected at the transaction level and reported under the special database entry ALLDBS. NO I/O counts are not collected.

IOWAITS provides the same level of data as BFALTERS for accounting and for the transaction, program, and totals levels of I/O analysis. For performance analysis at the database level, DL/I calls, reads, and some writes are still available. The other writes are reported per program.

IOWAITS is the default and recommended option because Event Collector CPU usage is significantly less than with BFALTERS, which can increase MVIMS CPU usage by 30 to 40 percent over the IOWAITS option, depending on the amount of database activity. Using the IOWAITS option increases the MVIMS CPU usage by 5 to 10 percent over DBIO=NONE, depending on the number of database I/Os.

DBIO=NONE specifies that reads, writes, and NO I/O counts are not collected. DL/I calls are still available by database.

Note: The DBIO parameter does not affect Fast Path databases.

Extended Recovery

DEPREC=YES | NO

DEPREC controls whether recovery from additional abend conditions in dependent regions is enabled and performed as necessary.

MVIMS CPU usage may be increased 10 to 30 percent over the DEPREC=NO option, depending on the options chosen for other parameters (because the more work the Event Collector does, the more overhead is added by this option).

The default should remain set until MVIMS is thoroughly tested and stable in each environment. If CPU utilization is still a concern after the other options are chosen, you could then set this parameter to NO for additional savings.

CPU Timing

The Event Collector accumulates CPU times in eleven categories and maintains several CPU fields in the MVIMS log records and IRUF records. The values in these fields, or various combinations of the values, are reported.

Application Program CPU

Application program CPU, also called message region CPU, is collected unless CPU=NONE. This value is the time spent by the application program in the dependent region.

Note: This field includes user-attributable CPU time incurred in DB2 through the IMS Attach Facility if the parameter FEATURE=NODB2 is specified in PARMLIB member IMFSYS00 (see PARMLIB member IMFSYSBB for more information).

Application program CPU is included in chargeable CPU, which is CPU time that is directly attributable to the user who submitted the transaction.

The BILLOVHD parameter can affect this value by optionally adding some dependent region overhead.

Message DL/I CPU

Message DL/I CPU is the time spent in the dependent region processing DL/I requests. This time value usually includes most of the time involved in processing database calls.

This value is collected unless CPU=NONE. The time is included in chargeable CPU, which is CPU time that is directly attributable to the user who submitted the transaction.

LSO=Y and BMPs and JBPs in nonparallel DL/I mode reduce this value (moving time to control DL/I CPU)..

Control DL/I CPU

Control DL/I CPU is the time spent in the control region (or in DLISAS if LSO=S) processing DL/I requests. The major portion of this time is for message queue calls.

If LSO=Y, most database DL/I work is done under the LSO subtasks in the control region. If LSO=S, the serialized database processing occurs in the DLISAS region but is accumulated with the control region CPU time.

The control DL/I CPU value is collected only if CPU=ALL. The value is included in chargeable CPU, which is CPU time that is directly attributable to the user who submitted the transaction.

If CPU=DEP, total DL/I CPU is generally 5 to 15 percent less than with the CPU=ALL option, because control DL/I CPU is not measured. If LSO=Y or BMP and JBP nonparallel processing is used, much more data is lost.

DB2 CPU

DB2 CPU is the amount of dependent region CPU time (in thousandths of a second) that is used by the transaction to make DB2 requests. The request generally runs in cross-memory mode under the IMS dependent region program controller task.

The DB2 CPU value is collected only if CPU=ALL, CPU=DEP, or CPU=DEPDB2. The value is included in chargeable CPU, which is CPU time that is directly attributable to the user who submitted the transaction.

Message Buffer CPU

Message buffer CPU is the time spent in the IMS database buffer handler routines during database DL/I call processing. Message buffer CPU is collected under the dependent region task.

The message buffer CPU value is collected if BHTO=ON and if CPU=ALL or CPU=DEP. BHTO is forced to OFF unless DBIO=BFALTERS.

If BHTO=OFF (the default), this time is zero and the CPU is included in message DL/I CPU. Message buffer CPU time can be timed separately to exclude it from chargeable CPU, because the time can be considered an overhead function within IMS.

LSO=Y and BMPs and JBPs in nonparallel DL/I mode reduce this value (moving time to control buffer CPU).

Control Buffer CPU

Control buffer CPU is the time spent in the IMS database buffer handler routines during database DL/I call processing. Control buffer CPU is collected in the control or DLISAS regions.

The control buffer CPU value is collected if BHTO=ON and CPU=ALL. BHTO is forced to OFF unless DBIO=BFALTERS.

If BHTO=OFF (the default), this time is zero and the CPU is included in control DL/I CPU. The time can be timed separately to exclude it from chargeable CPU, because the time can be considered an overhead function within IMS.

LSO=Y and BMPs and JBPs in nonparallel DL/I mode increase this value.

Message OPEN/CLOSE CPU

IMS DL/I CPU time spent in database OPEN/CLOSE activity under the dependent region TCB is for Fast Path databases only. Full function database OPEN/CLOSE activity is performed in the control region.

MVIMS treats DL/I CPU time as overhead CPU.

The DL/I CPU time value is collected unless CPU=NONE.

Control OPEN/CLOSE CPU

All full function database OPEN/CLOSE activity is performed in the control region under the control task TCB. This activity includes all processing done in the IMS OPEN/CLOSE module DFSDLOC0. If LSO=S, the processing occurs in the DLISAS address space but is accumulated in this field.

MVIMS treats control OPEN/CLOSE CPU time as overhead CPU.

This value is only collected if CPU=ALL.

Program Scheduling CPU

Program scheduling activity occurs in the control region and, if LSO=S, partially in the DLISAS region. The program scheduling activity in both regions are accumulated in this field.

MVIMS treats program scheduling CPU time as overhead CPU.

This value is only collected if CPU=ALL.

Message Region Overhead CPU

The message region overhead CPU value is always collected. This value is the amount of overhead CPU time (both TCB and SRB) that was spent in the dependent region and that was not directly attributable to a transaction. The value usually includes program initialization and termination.

- If the startup parameter BILLOVHD=NO (the default), the value includes the time between the end of scheduling and the first program DL/I call.
- If BILLOVHD=YES, this time is included in application program CPU (dependent region). Program load time is attributed to the first transaction processed and is chargeable.
- If CPU=NONE, the value includes all CPU time incurred in the dependent regions. For all the other CPU options, the value includes all dependent region CPU not identified as application program, DL/I, buffer, or OPEN/CLOSE CPU (for example, region startup).

Note: Use of the parameter CPUOVHD=REFCPU sets this value to zero.

Control Region Overhead

The control region overhead value is always collected.

- If CPU=ALL, this value includes all control/DLISAS CPU not identified as DL/I, buffer, program scheduling or OPEN/CLOSE CPU (control region initialization, for example).

- For all the other CPU options, the value includes all CPU time incurred in the control/DLISAS regions.

Note: Use of the parameter CPUOVHD=REFCPU sets this value to zero.

The control region overhead CPU time for a program includes the nonattributable control region overhead CPU time (both TCB and SRB) measured between the last program termination (in any IMS region) and the termination of this one. The program accounting record (PAR) has the following two control region overhead fields:

1. The first PAR field for control region overhead contains the nonattributable overhead field and several other overhead fields, accumulated for a program. This value includes scheduling CPU time from this program record and the three control region CPU times from the corresponding transaction records.

2. The second PAR field includes only the nonattributable overhead figure. If you are writing a program to accumulate total CPU time for any time period, use this field.

Tip: When you review CPU time, make comparisons carefully. If the comparisons are against address space statistics, be sure to include all the CPU times for that region and no others.

The job name of the dependent region (region ID) where processing took place is available in both the TAR and PAR records.

Database I/O Data

MVIMS collects all database activity indicators per transaction at the database level. A separate segment is appended to the MVIMS transaction record per accessed database to hold the counts (see the MVIMS transaction log record layout in the *MAINVIEW for IMS Offline – Customization and Utilities Guide*). This process allows later reporting by transaction, by user (for accounting), and by database, which is always true for the DL/I calls. Each call is counted by type (GU, ISRT, and so on) and per DBD.

These database segments also contain fields for several I/O-related counts. I/O activity is split into categories according to whether the I/O was a read or write, key or nonkey access. One additional count, called NO I/O, is unique to MVIMS. This count is a measure of IMS overhead and is the number of requests to the IMS buffer handler that do *not* result in I/O. These counts can be affected by the Event Collector parameters.

Note: If DBTNAME=DD is specified, database reads and writes and reads without I/O counts (NO I/O counts) are collected at the data set level, except for Fast Path DEDBs.

Database Reads

Reads are counted as key or nonkey reads. No database reads are collected if DBIO=NONE (except for DEDBs and MSDBs).

The database read counts are collected at the database level with both DBIO=BFALTERS and DBIO=IOWAITS.

Reads caused by access through a secondary index or logical database are counted with DBIO=BFALTERS and DBIO=IOWAITS, but are shown for the actual target DBD (DBPCB).

Note: This process may cause key I/O to appear for nonkey databases, such as HDAM.

Database Writes

Writes are counted as key and nonkey writes. No database writes are collected if DBIO=NONE (except for DEDBs).

If DBIO=BFALTERS:

- All writes are collected at the database level.
- Writes to maintain a secondary index or logical database are collected. Counts are maintained at the database level (DBPCB).

If DBIO=IOWAITS:

- Most writes are collected at the transaction level and reported under the database entry ALLDBS, including all writes occurring at sync point (the majority). These counts correspond closely to the DC Monitor IWAITS reported under the I/O PCB (Program I/O report).
- Database writes that occur during call processing (such as the deletion of a HISAM root) are accumulated by database.
- Writes to maintain a secondary index or logical database are collected under the DBD that is the actual target (DBPCB).
- VSAM-initiated writes for buffer steal and background write are not measured.
- OSAM buffer steal writes are accumulated in the (otherwise unused) NO I/O counter for the database/transaction whose read request forced the buffer steal.
- Chained VSAM or OSAM writes of multiple buffers count as one write.

NO I/O

NO I/O counts are collected only if DBIO=BFALTERS.

NO I/O measures the number of requests to the IMS buffer handler that do not result in I/O.

DB2 Subsystem Activity

MVIMS measures the number of DB2 calls made through the IMS Attach Facility. I/O is not measured. The call counts are recorded in an optional segment at the end of the MVIMS transaction record. The transaction record is described in the “Transaction Accounting Record (TAR) Layout” section of the “IRUF Record Layout Descriptions” appendix of the *MAINVIEW for IMS Offline – Customization and Utilities Guide*.

BMP and JBP Data

BMP and JBP data are always collected unless BMP=NO or BMP=NOCPU is specified. If BMP=NO, no BMP or JBP transaction and program records are produced, which affects all MVIMS reports. If BMP=NOCPU, all CPU timing fields in the BMP and JBP records are zero. DL/I calls and database I/O statistics are collected.

Chapter 3 Total IMS Resource Usage Analysis Report (TASCOSTR)

The TASCOSTR program summarizes resource usage data from the terminal, program, and transaction records. CPU usage is shown on the TASCOSTR report either as user-related (chargeable) or as overhead (not chargeable). The report also shows the total number of programs and transactions, DL/I and DB2 subsystem requests, and terminal and database I/O.

The TASCOSTR report is an overview that contains no costing information. The report is used primarily to track total resource consumption.

Objective:

Quantify dynamic resources consumed for the total IMS system.

Use:

Determine the profile of the IMS workload for activity (programs, transaction, DL/I or SQL calls) and resources consumed (CPU and I/O).

Input and Output

The Performance Reporter version of TASCOSTR summarizes the IRUF and produces the Total IMS Resource Usage Analysis report. If the Transaction Accountant is also installed, that version of TASCOSTR is executed instead (see the *MAINVIEW for IMS Offline – Transaction Accountant Reference Manual*).

Report Element Descriptions

This section describes the elements of the Total IMS Resource Usage Analysis report produced by TASCOSTR.

DBCTL Threads:

DBCTL CICS and ODBA thread activity can be reported by TASCOSTR. The following considerations apply:

- CICS=YES or CICS=OFFLINE must be specified for the Event Collector in BBPARM member IMFECP00.
- Any CPU time reported for DBCTL threads is only the DL/I portion of the application CPU time.
- DBCTL thread resources are included in the MPP workload column.

Examples of the Total IMS Resource Usage Analysis report pages are shown in Figures 3-1 through 3-4.

Figure 3-1 provides an example of the Total IMS Resource Usage Analysis report showing the CPU usage and system availability page.

Figure 3-1 CPU Usage and System Availability

```
**** IMF ****                                IMS PERFORMANCE REPORTER                                  **** IMF ****
CURRENT DATE - 03/22/yy <1>                TOTAL IMS RESOURCE USAGE ANALYSIS                          PAGE NO -    1
IMSID - PHIR <2> IMS LEVEL  - xx00 <4>                                      <6> EARLIEST START - yy.068 11:25:20
SMFID - V683 <3> LSO OPTION - S <5>                                         <7> LATEST STOP - yy.068    16:29:17
*************************************************************************************************************************
*              <8>                 *             <9>          *             <10>          *             <11>          *
*     RESOURCE IDENTIFICATION      *          MPP WORKLOAD    *          BMP WORKLOAD     *             TOTAL         *
*                                  *       QUANTITY  % TOTAL  *       QUANTITY  % TOTAL   *           WORKLOAD        *
*                                  *                 WORKLOAD *                 WORKLOAD  *                           *
*************************************************************************************************************************
*                                  *                          *                           *                           *
*  IMS OVERHEAD CPU USAGE <12>     *                          *                           *                           *
*                                  *                          *                           *                           *
*     CONTROL REGION/DLISAS CPU TIME *          268.94  100.0% *            0.00    0.0%   *             268.94        *
*     BUFFER HANDLING CPU TIME     *            0.00    0.0%  *            0.00    0.0%   *               0.00        *
*     OPEN/CLOSE PROCESSING CPU TIME *          0.00    0.0%  *            0.00    0.0%   *               0.00        *
*     PROGRAM SCHEDULING CPU TIME  *            0.00    0.0%  *            0.00    0.0%   *               0.00        *
*     MESSAGE REGION OVERHEAD CPU TIME *        395.99  100.0% *            0.00    0.0%   *             395.99        *
*     *******  TOTAL OVERHEAD CPU  *          664.93  100.0% *            0.00    0.0%   *             664.93        *
*     *******  AVG OVERHEAD CPU/TRAN *      0.02183           *       0.00000            *          0.02183          *
*                                  *                          *                           *                           *
*  IMS CHARGEABLE CPU USAGE <13>   *                          *                           *                           *
*                                  *                          *                           *                           *
*     APPLICATION PROGRAM CPU TIME *          552.07  100.0% *            0.00    0.0%   *             552.07        *
*     DL/I CPU TIME                *          657.26  100.0% *            0.00    0.0%   *             657.26        *
*     DB2 CPU TIME                 *            2.15  100.0% *            0.00    0.0%   *               2.15        *
*     *******  TOTAL CHARGEABLE CPU *        1,211.48  100.0% *            0.00    0.0%   *           1,211.48        *
*     *******  AVG CHARGEABLE CPU/TRAN *    0.03977           *       0.00000            *          0.03977          *
*     *******  AVG DL/I CPU / DB CALL *     0.00042           *       0.00000            *          0.00042          *
*     *******  AVG DB2 CPU / DB2 CALL *     0.00754           *       0.00000            *          0.00754          *
*                                  *                          *                           *                           *
*  IMS TOTAL CPU USAGE <14>        *                          *                           *                           *
*                                  *                          *                           *                           *
*     CONTROL REGION/DLISAS CPU TIME *          268.94  100.0% *            0.00    0.0%   *             268.94        *
*     DEPENDENT REGION CPU TIME    *          1,607.47  100.0% *            0.00    0.0%   *           1,607.47        *
*     *******  TOTAL IMS CPU       *          1,876.41  100.0% *            0.00    0.0%   *           1,876.41        *
*     *******  AVG CPU/TRAN        *        0.06160           *       0.00000            *          0.06160          *
*     *******  % DEP.REGION/TOTAL CPU *          85.6%         *             0.0%         *              85.6%        *
*     *******  % CHARGEABLE/TOTAL CPU *          64.5%         *             0.0%         *              64.5%        *
*                                  *                          *                           *                           *
*                                  *                          *                           *                           *
*  IMS SCHEDULING ACTIVITY <15>    *                          *                           *                           *
*                                  *                          *                           *                           *
*     NUMBER OF PROGRAMS           *           20,316  100.0% *               0    0.0%   *            20,316         *
*     NUMBER OF PROGRAM ABENDS-SYSTEM *            2  100.0% *               0    0.0%   *                2          *
*     NUMBER OF PROGRAM ABENDS-USER *             15  100.0% *               0    0.0%   *               15          *
*     NUMBER OF TRANSACTIONS       *           30,459  100.0% *               0    0.0%   *            30,459         *
*     NUMBER OF TRANS. ACCESSING DB2 *           180  100.0% *               0    0.0%   *              180          *
*     *******  AVG TRANS/PROGRAM   *          1.499           *           0.000            *            1.499          *
*                                  *                          *                           *                           *
*************************************************************************************************************************
```

Figure 3-2 provides an example of the Total IMS Resource Usage Analysis report showing the Full Function Workload page.

Figure 3-2 Full Function Workload

```
**** IMF ****                                      IMS PERFORMANCE REPORTER                                      **** IMF ****
CURRENT DATE - 03/22/yy <1>                    TOTAL IMS RESOURCE USAGE ANALYSIS                                  PAGE NO -    1
IMSID - PHIR <2> IMS LEVEL  - xx00 <4>              FULL FUNCTION WORKLOAD                   <6> EARLIEST START - yy.068 11:25:20
SMFID - V683 <3> LSO OPTION - S <5>                                                          <7> LATEST STOP - yy.068    16:29:17
*********************************************************************************************************************************
*              <8>                    *            <9>           *            <10>          *                <11>               *
*       RESOURCE IDENTIFICATION       *        MPP WORKLOAD      *        BMP WORKLOAD      *                TOTAL              *
*                                     *      QUANTITY   % TOTAL  *      QUANTITY   % TOTAL  *               WORKLOAD            *
*                                     *                WORKLOAD  *                WORKLOAD  *                                   *
*********************************************************************************************************************************
*                                     *                          *                          *                                   *
*   IMS TERMINAL I/O <16>             *                          *                          *                                   *
*                                     *                          *                          *                                   *
*       FULL FUNCTION TRANS (MSG Q)   *        30,459    100.0%  *             0      0.0%  *                30,459             *
*                                     *                          *                          *                                   *
*       INPUT CALLS - MGU/MGN         *        30,509    100.0%  *             0      0.0%  *                30,509             *
*       OUTPUT CALLS - MISRT/MPURG    *       152,522    100.0%  *             0      0.0%  *               152,522             *
*       *******  TOTAL TERMINAL I/O   *       183,031    100.0%  *             0      0.0%  *               183,031             *
*       *******  AVG TERMINAL I/O / TRAN *    6.009                *        0.000             *               6.009               *
*                                     *                          *                          *                                   *
*   IMS FULL FUNCTION DATA BASE REQUESTS <17>                    *                          *                                   *
*                                     *                          *                          *                                   *
*       TRANS ACCESSING FF DBS        *        30,302    100.0%  *             0      0.0%  *                30,302             *
*                                     *                          *                          *                                   *
*       DL/I GET UNIQUES              *       260,198    100.0%  *             0      0.0%  *               260,198             *
*       DL/I GET NEXT                 *     1,240,969    100.0%  *             0      0.0%  *             1,240,969             *
*       *******  TOTAL GET CALLS      *     1,501,167    100.0%  *             0      0.0%  *             1,501,167             *
*       *******  AVG GET CALLS / TRAN *     49.540               *        0.000             *              49.540               *
*                                     *                          *                          *                                   *
*       DL/I DELETES                  *        10,864    100.0%  *             0      0.0%  *                10,864             *
*       DL/I REPLACES                 *        45,938    100.0%  *             0      0.0%  *                45,938             *
*       DL/I INSERTS                  *        13,401    100.0%  *             0      0.0%  *                13,401             *
*       *******  TOTAL UPDATE CALLS   *        70,203    100.0%  *             0      0.0%  *                70,203             *
*       *******  AVG UPDATE CALLS / TRAN *    2.316                *        0.000             *               2.316               *
*                                     *                          *                          *                                   *
*       TOTAL DL/I DATA BASE CALLS    *     1,571,370    100.0%  *             0      0.0%  *             1,571,370             *
*       *******  AVG DL/I CALLS / TRAN *    51.856               *        0.000             *              51.856               *
*       *******  % UPDATE CALLS       *           4.4%           *            0.0%          *                    4.4%           *
*                                     *                          *                          *                                   *
*   IMS FULL FUNCTION DATA BASE I/O <18> *                       *                          *                                   *
*                                     *                          *                          *                                   *
*       KEY READS                     *           157    100.0%  *             0      0.0%  *                   157             *
*       NONKEY READS                  *        84,163    100.0%  *             0      0.0%  *                84,163             *
*       *******  TOTAL READ I/O       *        84,320    100.0%  *             0      0.0%  *                84,320             *
*       *******  AVG READ I/O / TRAN  *       2.782              *        0.000             *               2.782               *
*                                     *                          *                          *                                   *
*       KEY WRITES                    *           261    100.0%  *             0      0.0%  *                   261             *
*       NONKEY WRITES                 *        28,579    100.0%  *             0      0.0%  *                28,579             *
*       *******  TOTAL WRITE I/O      *        28,840    100.0%  *             0      0.0%  *                28,840             *
*       *******  AVG WRITE I/O / TRAN *       0.951              *        0.000             *               0.951               *
*                                     *                          *                          *                                   *
*       TOTAL DATA BASE I/O           *       113,160    100.0%  *             0      0.0%  *               113,160             *
*       *******  AVG I/O / TRAN       *       3.734              *        0.000             *               3.734               *
*       *******  % KEY I/O            *           0.3%           *            0.0%          *                    0.3%           *
*       *******  % WRITE I/O          *          25.4%           *            0.0%          *                   25.4%           *
*                                     *                          *                          *                                   *
*********************************************************************************************************************************
```

Figure 3-3 provides an example of the Total IMS Resource Usage Analysis report showing the Fast Path Workload page.

Note: If there is no Fast Path activity, the Fast Path workload page is not produced.

Figure 3-3 Fast Path Workload

```
**** IMF ****                                IMS PERFORMANCE REPORTER                                  **** IMF ****
CURRENT DATE - 03/22/yy <1>                TOTAL IMS RESOURCE USAGE ANALYSIS                          PAGE NO -    1
IMSID - PHIR <2> IMS LEVEL  - xx00 <4>             FAST PATH WORKLOAD                <6> EARLIEST START - yy.068 11:25:20
SMFID - V683 <3> LSO OPTION - S <5>                                                  <7> LATEST STOP - yy.068    16:29:17
*****************************************************************************************************************
*              <8>                 *              <9>          *             <10>          *             <11>          *
*      RESOURCE IDENTIFICATION     *          MPP WORKLOAD     *          BMP WORKLOAD     *           TOTAL           *
*                                  *       QUANTITY   % TOTAL  *       QUANTITY   % TOTAL  *          WORKLOAD         *
*                                  *                  WORKLOAD *                  WORKLOAD *                           *
*****************************************************************************************************************
*                                  *                           *                           *                           *
*  IMS TERMINAL I/O <19>           *                           *                           *                           *
*                                  *                           *                           *                           *
*      FAST PATH TRANSACTIONS (EMH)*              0     0.0%  *              0     0.0%  *                 0         *
*                                  *                           *                           *                           *
*      INPUT CALLS - MGU           *              0     0.0%  *              0     0.0%  *                 0         *
*      OUTPUT CALLS - MISRT/MPURG  *              0     0.0%  *              0     0.0%  *                 0         *
*      *******  TOTAL TERMINAL I/O *              0     0.0%  *              0     0.0%  *                 0         *
*      *******  AVG TERMINAL I/O / TRAN *    0.000             *        0.000             *           0.000         *
*                                  *                           *                           *                           *
*                                  *                           *                           *                           *
*  IMS FAST PATH DATA BASE REQUESTS <20>*                      *                           *                           *
*                                  *                           *                           *                           *
*      TRANS ACCESSING FP DBS      *             93   100.0%  *              0     0.0%  *                 93        *
*                                  *                           *                           *                           *
*      DL/I GET UNIQUES            *            186   100.0%  *              0     0.0%  *                186        *
*      DL/I GET NEXT               *              0     0.0%  *              0     0.0%  *                  0        *
*      *******  TOTAL GET CALLS    *            186   100.0%  *              0     0.0%  *                186        *
*      *******  % MSDB GET CALLS   *            0.0%          *            0.0%          *               0.0%        *
*                                  *                           *                           *                           *
*      DL/I DELETES                *              0     0.0%  *              0     0.0%  *                  0        *
*      DL/I REPLACES               *              0     0.0%  *              0     0.0%  *                  0        *
*      DL/I INSERTS                *              0     0.0%  *              0     0.0%  *                  0        *
*      *******  TOTAL UPDATE CALLS *              0     0.0%  *              0     0.0%  *                  0        *
*      *******  % MSDB UPDATE CALLS*            0.0%          *            0.0%          *               0.0%        *
*                                  *                           *                           *                           *
*      TOTAL DL/I DATA BASE CALLS  *            186   100.0%  *              0     0.0%  *                186        *
*      *******  AVG DL/I CALLS / TRAN *      2.000             *        0.000             *           2.000         *
*      *******  % MSDB CALLS       *            0.0%          *            0.0%          *               0.0%        *
*                                  *                           *                           *                           *
*  IMS FAST PATH DATA BASE I/O <21>*                           *                           *                           *
*                                  *                           *                           *                           *
*      DEDB READS                  *            217   100.0%  *              0     0.0%  *                217        *
*      *******  AVG READ I/O / TRAN *        2.333             *        0.000             *           2.333         *
*                                  *                           *                           *                           *
*      DEDB WRITES                 *              0     0.0%  *              0     0.0%  *                  0        *
*      *******  AVG WRITE I/O / TRAN *       0.000             *        0.000             *           0.000         *
*                                  *                           *                           *                           *
*      TOTAL DATA BASE I/O         *            217   100.0%  *              0     0.0%  *                217        *
*      *******  AVG I/O / TRAN     *        2.333             *        0.000             *           2.333         *
*      *******  % WRITE I/O        *            0.0%          *            0.0%          *               0.0%        *
*                                  *                           *                           *                           *
*****************************************************************************************************************
```

Figure 3-4 provides an example of the Total IMS Resource Usage Analysis report showing the DB2 Workload page.

Note: The DB2 workload page is not produced if there is no DB2 activity through the IMS Attach Facility or if the parameter FEATURE=NODB2 is specified in PARMLIB member IMFSYS00 (see PARMLIB member IMFSYSBB for more information).

Figure 3-4 DB2 Workload

```
**** IMF ****                                IMS PERFORMANCE REPORTER                                  **** IMF ****
CURRENT DATE - 03/22/yy <1>                TOTAL IMS RESOURCE USAGE ANALYSIS                          PAGE NO -    1
IMSID - PHIR <2> IMS LEVEL  - xx00 <4>                DB2 WORKLOAD                  <6> EARLIEST START - yy.068 11:25:20
SMFID - V683 <3> LSO OPTION - S <5>                                                 <7> LATEST STOP - yy.068    16:29:17
*****************************************************************************************************************
*               <8>                 *              <9>          *              <10>          *              <11>          *
*      RESOURCE IDENTIFICATION      *          MPP WORKLOAD     *          BMP WORKLOAD      *           TOTAL          *
*                                   *        QUANTITY   % TOTAL *        QUANTITY   % TOTAL  *          WORKLOAD        *
*                                   *                  WORKLOAD *                  WORKLOAD  *                          *
*****************************************************************************************************************
*                                   *                           *                            *                          *
*  DB2 REQUESTS      SSID - DBPR <22>*                           *                            *                          *
*                                   *                           *                            *                          *
*      NUMBER OF TRANS. ACCESSING DB2*            180   100.0%  *              0     0.0%    *              180         *
*                                   *                           *                            *                          *
*      DB2 SELECTS/FETCHES          *             23   100.0%  *              0     0.0%    *               23         *
*      DB2 OPENS                    *              0     0.0%  *              0     0.0%    *                0         *
*      ******* TOTAL GET CALLS      *             23   100.0%  *              0     0.0%    *               23         *
*      ******* AVG GET CALLS / TRAN *          0.127            *          0.000            *            0.127         *
*                                   *                           *                            *                          *
*      DB2 INSERTS                  *            258   100.0%  *              0     0.0%    *              258         *
*      DB2 DELETES                  *              1   100.0%  *              0     0.0%    *                1         *
*      DB2 UPDATES                  *              3   100.0%  *              0     0.0%    *                3         *
*      ******* TOTAL UPDATE CALLS   *            262   100.0%  *              0     0.0%    *              262         *
*      ******* AVG UPDATE CALLS / TRAN*         1.455            *          0.000            *            1.455         *
*                                   *                           *                            *                          *
*      DB2 DATA DEF. LANGUAGE (DDL) *              0     0.0%  *              0     0.0%    *                0         *
*      DB2 DYNAMIC SQL CALLS        *              0     0.0%  *              0     0.0%    *                0         *
*      DB2 SQL CONTROL CALLS        *              0     0.0%  *              0     0.0%    *                0         *
*      DB2 OTHER CALLS              *              0     0.0%  *              0     0.0%    *                0         *
*      ******* TOTAL SPECIAL CALLS  *              0     0.0%  *              0     0.0%    *                0         *
*      ******* AVG SPECIAL CALLS / TRAN*        0.000            *          0.000            *            0.000         *
*                                   *                           *                            *                          *
*      TOTAL DB2 CALLS              *            285   100.0%  *              0     0.0%    *              285         *
*      ******* AVG DB2 CALLS / TRAN *          1.583            *          0.000            *            1.583         *
*      ******* % UPDATE CALLS       *            91.9%          *             0.0%          *              91.9%       *
*                                   *                           *                            *                          *
*****************************************************************************************************************
```

Table 3-1 describes IMS Resource Usage Analysis report elements. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 3-1 IMS Resource Usage Analysis Report Elements (Part 1 of 7)

<1> CURRENT DATE Date this report was generated, in mm/dd/yy format.
<2> IMSID Identification code for the IMS that processed the transactions.
<3> SMFID Identification code from the SMCA for the computing system that processed the transactions.
<4> IMS LEVEL IMS release number and modification level.
<5> LSO OPTION LSO processing option (N, Y, X, or S) in effect.
<6> EARLIEST START Julian date and time of day when the first terminal session started.
<7> LATEST STOP Julian date and time of day when the last terminal session ended.
<8> RESOURCE IDENTIFICATION Resource used. Resources are grouped by IMS OVERHEAD CPU USAGE IMS CHARGEABLE CPU USAGE IMS TOTAL CPU USAGE IMS SCHEDULING ACTIVITY IMS TERMINAL I/O (full function transactions) IMS FULL FUNCTION DATABASE REQUESTS IMS FULL FUNCTION DATABASE I/O IMS TERMINAL I/O (Fast Path transactions) IMS FAST PATH DATABASE REQUESTS IMS FAST PATH DATABASE I/O DB2 REQUESTS
<9> MPP WORKLOAD IMS workload that is MPP (message processing program), JMP (Java message processing program), TPI (CPI-C–driven program), DBCTL threads (CICS and ODBA), and MDP (message-driven program). **QUANTITY**. Amount of the IMS workload attributable to MPPs, JMPs, TPI, DBCTL threads (CICS and ODBA), and MDPs for CPU consumed, scheduling activity, I/O activity, or requests made to a database or DB2 subsystem. **% TOTAL WORKLOAD**. Percentage of the total resources consumed that is attributable to MPPs, JMPs, TPI, DBCTL threads (CICS and ODBA), and MDPs.

Table 3-1 IMS Resource Usage Analysis Report Elements (Part 2 of 7)

<10> BMP WORKLOAD IMS workload that is BMP (batch message processing), JBP (Java batch message processing), FPU (Fast Path utility), and NDP (non-message-driven program). **QUANTITY**. Amount of the IMS workload attributable to BMPs, JBPs, FPU, and NDP for CPU consumed, scheduling activity, I/O activity, or requests made to a database or DB2 system. **% TOTAL WORKLOAD**. Percentage of the total resources consumed that is attributable to BMP, JBP, FPU, and NDP.
<11> TOTAL WORKLOAD Total amount of resources used for the total workload.
<12> IMS OVERHEAD CPU USAGE Amount of CPU time (expressed in seconds) consumed as IMS overhead. **CONTROL REGION/DLISAS CPU TIME**. Amount of CPU time used by the IMS DLISAS address spaces after buffer handling, OPEN/CLOSE, and program scheduling CPU time have been subtracted. (For more information, see “Control Region Overhead” on page 2-11.) The calculation method for this field uses the program record (PAR) field that only includes the nonattributable overhead values. This method is more accurate when subsetted IRUFs are used as input (all matching transaction and program records may not be available). **BUFFER HANDLING CPU TIME**. Amount of CPU time used in searching and managing the database I/O buffer pool. (For more information, see “Message Buffer CPU” on page 2-8 and “Control Buffer CPU” on page 2-9.) **OPEN/CLOSE PROCESSING CPU TIME**. Amount of CPU time used in opening and closing data sets for use by DL/I. (For more information, see “Message OPEN/CLOSE CPU” on page 2-9.) **PROGRAM SCHEDULING CPU TIME**. Amount of CPU time used for program scheduling and termination in the CONTROL REGION/DLISAS address spaces. (For more information, see “Program Scheduling CPU” on page 2-10.) **MESSAGE REGION OVERHEAD CPU TIME**. Amount of additional overhead CPU time used in the message region. The value includes all dependent region CPU time except for application program and message DL/I, OPEN/CLOSE, or DB2 CPU time. (For more information, see “Message Region Overhead CPU” on page 2-10.) **TOTAL OVERHEAD CPU TIME**. Sum of CONTROL REGION/DLISAS, buffer handler, OPEN/CLOSE, program scheduling, and message region overhead CPU times. **AVG OVERHEAD CPU/TRAN**. Average overhead CPU time per transaction.

Table 3-1 IMS Resource Usage Analysis Report Elements (Part 3 of 7)

<13> IMS CHARGEABLE CPU USAGE

Amount of CPU time (expressed in seconds) directly attributed to the processing of a particular transaction.

APPLICATION PROGRAM CPU TIME. CPU directly attributable to the application program. (For more information, see “Application Program CPU” on page 2-7.)

DL/I CPU TIME. Amount of CPU time used by DL/I in processing the DL/I requests, excluding the overhead items OPEN/CLOSE CPU times and optionally that of buffer handler CPU time. (For more information, see “Message DL/I CPU” on page 2-7 and “Control DL/I CPU” on page 2-8.)

DB2 CPU TIME. Amount of CPU time spent processing DB2 calls. (For more information, see “DB2 CPU” on page 2-8.)

TOTAL CHARGEABLE CPU. Sum of application program, DL/I, and DB2 CPU time.

AVG CHARGEABLE CPU/TRAN. Average amount of chargeable CPU time per transaction.

AVG DL/I CPU / DB CALL. Average amount of chargeable DL/I CPU time per call to a DL/I database.

AVG DB2 CPU / DB2 CALL. Average amount of chargeable DB2 CPU time per call to a DB2 subsystem.

<14> IMS TOTAL CPU USAGE

Amount of control region, DLISAS, and dependent region CPU time spent processing transactions.

CONTROL REGION/DLISAS CPU TIME. Sum of control region DL/I, buffer, program scheduling, OPEN/CLOSE (full function databases), and overhead CPU time.

DEPENDENT REGION CPU TIME. Sum of application program, DB2, message region DL/I, buffer, OPEN/CLOSE (Fast Path databases), and message region overhead CPU time.

TOTAL IMS CPU. Sum of the control, DLISAS, and dependent region CPU time used.

AVG CPU/TRAN. Average CPU time spent processing each transaction.

% DEP. REGION/TOTAL CPU. Dependent region usage percentage of total CPU, calculated as

```
(Dependent region CPU × 100) ÷ Total IMS CPU
```

% CHARGEABLE TOTAL CPU. Percentage of total CPU consumed that is chargeable, calculated as

```
[(DLI CPU + DB2 CPU + Application Program) × 100]) ÷ Total CPU
```

<15> IMS SCHEDULING ACTIVITY

Number of programs executed and transactions processed during the summarization period. These figures allow approximation of I/O required for IMS supervisory functions.

NUMBER OF PROGRAMS. Number of programs executed.

NUMBER OF PROGRAM ABENDS - SYSTEM. Number of programs that incurred a system abend.

NUMBER OF PROGRAM ABENDS - USER. Number of programs that incurred a user abend.

NUMBER OF TRANSACTIONS. Number of transactions processed.

NUMBER OF TRANS. ACCESSING DB2. Number of transactions that accessed a DB2 subsystem.

AVG TRANS/PROGRAM. Average number of transactions per program, calculated as

```
Number of Transactions ÷ Number of Programs
```

Table 3-1 IMS Resource Usage Analysis Report Elements (Part 4 of 7)

<16> IMS TERMINAL I/O

Number of DL/I message calls (terminal I/O) issued in processing the full function message queue transaction volume.

FULL FUNCTION TRANS (MSG Q). Number of transactions processed through the full function message queue.

INPUT CALLS - MGU/MGN. Number of MESSAGE GET UNIQUE and MESSAGE GET NEXT calls.

OUTPUT CALLS - MISRT/MPURG. Number of MESSAGE INSERT and MESSAGE PURGE calls.

TOTAL TERMINAL I/O. Sum of the input and output calls.

AVG TERMINAL I/O / TRAN. Average amount of terminal activity per transaction, calculated as

```
Total Terminal I/O ÷ Number of Transactions
```

<17> IMS FULL FUNCTION DATA BASE REQUESTS

Number of DL/I requests issued by transactions.

TRANS ACCESSING FF DBS. Number of transactions accessing full function databases.

DL/I GET UNIQUES. Number of GET UNIQUE calls.

DL/I GET NEXT. Number of GET NEXT calls.

TOTAL GET CALLS. Sum of GET UNIQUE and GET NEXT calls.

AVG GET CALLS/TRAN. Average number of GET calls per transaction, calculated as

```
Total GET Calls ÷Number of Transactions
```

Number of DL/I updates issued by transactions for

DL/I DELETES. Number of DELETE calls.

DL/I REPLACES. Number of REPLACE calls.

DL/I INSERTS. Number of INSERT calls.

TOTAL UPDATE CALLS. Sum of DELETE, REPLACE, and INSERT calls.

AVG UPDATE CALLS / TRAN. Average number of update calls per transaction, calculated as

```
Total Update Calls ÷ Number of Transactions
```

TOTAL DL/I DATA BASE CALLS. Total GET and UPDATE calls.

AVG DL/I CALLS / TRAN. Average number of DL/I calls per transaction, calculated as

```
Total DL/I Database Calls ÷ Number of Transactions
```

% UPDATE CALLS. Percentage of database calls for updates, calculated as

```
(Total Update Calls × 100) ÷ Number of DL/I Calls
```

Table 3-1 IMS Resource Usage Analysis Report Elements (Part 5 of 7)

<18> IMS FULL FUNCTION DATA BASE I/O
Amount of database I/O activity.
KEY READS. Number of reads to VSAM KSDSs to satisfy DL/I requests.
NONKEY READS. Number of reads to QSAM or VSAM KSDSs to satisfy DL/I requests.
TOTAL READ I/O. Sum of key and nonkey reads.
AVG READ I/O / TRAN. Average number of reads per transaction, calculated as
`Total Read I/O ÷ Number of Transactions`
KEY WRITES. Number of writes to VSAM KSDSs to satisfy DL/I requests.
NONKEY WRITES. Number of writes to QSAM or VSAM KSDSs to satisfy DL/I requests.
TOTAL WRITE I/O. Sum of key and nonkey writes.
AVG WRITE I/O / TRAN. Average number of writes per transaction, calculated as
`Total Write I/O ÷ Number of Transactions`
TOTAL DATA BASE I/O. Sum of total I/O READs and WRITEs.
AVG I/O / TRAN. Average I/O activity per transaction, calculated as
`Total I/O ÷ Number of Transactions`
% KEY I/O. Percentage of I/O activity for KSDSs, calculated as
`(Total Key I/O × 100) ÷Total Database I/O`
% WRITE I/O. Percentage of I/O activity for database WRITEs, calculated as
`(Total Write I/O × 100) ÷ Total Database I/O`
(See “Database Reads” on page 2-12 and “Database Writes” on page 2-13.)

<19> IMS TERMINAL I/O (not printed if there is no Fast Path activity) Number of DL/I message calls (terminal I/O) issued in processing the Fast Path transaction volume. **FAST PATH TRANSACTIONS (EMH)** . Number of Fast Path transactions processed through the Expedited Message Handler. **INPUT CALLS - MGU**. Number of MESSAGE GET UNIQUE calls. **OUTPUT CALLS - MISRT/MPURG**. Number of MESSAGE INSERT and MESSAGE PURGE calls. **TOTAL TERMINAL I/O**. Sum of the input and output calls. **AVG TERMINAL I/O / TRAN**. Average amount of terminal activity, calculated as `Total Terminal I/O ÷ Number of Fast Path Transactions`

Table 3-1 IMS Resource Usage Analysis Report Elements (Part 6 of 7)

<20> IMS FAST PATH DATA BASE REQUESTS (not printed if there is no Fast Path activity)

Number of DL/I requests issued to Fast Path databases (DEDBs and MSDBs).

TRANS ACCESSING FP DBS. Number of transactions accessing Fast Path databases.

DL/I GET UNIQUES. Number of GET UNIQUE calls.

DL/I GET NEXT. Number of GET NEXT calls.

TOTAL GET CALLS. Sum of GET UNIQUE and GET NEXT calls.

% MSDB GET CALLS. Percentage of MSDB calls for GET calls, calculated as

```
(Total Get Calls × 100) ÷ Number of MSDB Calls
```

Number of DL/I updates issued to Fast Path databases (DEDBs and MSDBs) for

DL/I DELETES. Number of DELETE calls.

DL/I REPLACES. Number of REPLACE calls.

DL/I INSERTS. Number of INSERT calls.

TOTAL UPDATE CALLS. Sum of DELETE, REPLACE, and INSERT calls.

% MSDB UPDATE CALLS. Percentage of MSDB calls for update calls, calculated as

```
(Total Update Calls × 100) ÷ Number of MSDB Calls
```

TOTAL DL/I DATA BASE CALLS. Total GET and UPDATE calls.

AVG DL/I CALLS / TRAN. Average number of calls per Fast Path transaction, calculated as

```
Total DL/I Database Calls ÷ Number of Fast Path Transactions
```

% MSDB CALLS. Percentage of MSDB calls for DL/I calls, calculated as

```
(Total MSDB Calls × 100) ÷ Number of DL/I Calls
```

<21> IMS FAST PATH DATA BASE I/O (not printed if there is no Fast Path activity)

Amount of Fast Path database I/O activity.

DEDB READS. Number of reads to DEDBs to satisfy DL/I requests.

AVG READ I/O / TRAN. Average number of reads per Fast Path transaction, calculated as

```
Total Read I/O ÷ Number of Fast Path Transactions
```

DEDB WRITES. Number of DEDB writes to satisfy DL/I requests.

AVG WRITE I/O / TRAN. Average number of writes per Fast Path transaction, calculated as

```
Total Write I/O ÷ Number of Fast Path Transactions
```

TOTAL DATA BASE I/O. Sum of DEDB reads and writes.

AVG I/O / TRAN. Average I/O activity per Fast Path transaction, calculated as

```
Total I/O ÷ Number of Fast Path Transactions
```

% WRITE I/O. Percentage of I/O activity for DEDB WRITEs, calculated as

```
(Total Write I/O × 100) ÷ Total DEDB I/O
```

(See “Database Reads” on page 2-12 and “Database Writes” on page 2-13.)

Table 3-1 IMS Resource Usage Analysis Report Elements (Part 7 of 7)

<22> DB2 REQUESTS SSID (not printed if there is no DB2 activity or if FEATURE=NODB2 in IMFSYS00)

Number of DB2 requests issued by transactions. The SSID (subsystem identification code) is the ID of the first subsystem accessed.

NUMBER OF TRANS ACCESSING DB2. Number of transactions that accessed a DB2 subsystem.

DB2 SELECTS/FETCHES. Number of SQL SELECTs and FETCHes to the DB2 subsystem.

DB2 OPENS. Number of SQL OPEN calls to the DB2 subsystem.

TOTAL GET CALLS. Sum of SQL SELECT/FETCH and OPEN calls.

AVG GET CALLS / TRAN. Average number of SELECT/FETCH and OPEN calls issued per DB2 transaction.

DB2 INSERTS. Number of SQL INSERT calls to the DB2 subsystem.

DB2 DELETES. Number of SQL DELETE calls to the DB2 subsystem.

DB2 UPDATES. Number of SQL UPDATE calls to the DB2 subsystem.

TOTAL UPDATE CALLS. Sum of SQL INSERT, DELETE, and UPDATE calls.

AVG UPDATE CALLS / TRAN. Average amount of update calls made by each DB2 transaction.

DB2 DATA DEF. LANGUAGE (DDL). Number of SQL Data Definition Language calls to the DB2 subsystem (CREATE, DROP, ALTER, COMMENT, LABEL).

DB2 DYNAMIC SQL CALLS. Number of SQL dynamic calls to the DB2 subsystem (PREPARE, DESCRIBE, EXECUTE).

DB2 SQL CONTROL CALLS. Number of SQL control-type calls to the DB2 subsystem (GRANT, REVOKE).

DB2 OTHER CALLS. Number of other SQL control-type calls to the DB2 subsystem (EXPLAIN, LOCK, LABEL, CLOSE).

TOTAL SPECIAL CALLS. Total DDL, DYNAMIC, control, and other SQL calls.

AVG SPECIAL CALLS / TRAN. Average number of special SQL calls per transaction, calculated as

```
Total Special SQL Calls ÷ Number of DB2 Transactions
```

TOTAL DB2 CALLS. Total number of all DB2 calls.

AVG DB2 CALLS / TRAN. Average number of DB2 calls per transactions, calculated as

```
Total DB2 Calls ÷ Number of DB2 Transactions
```

% UPDATE CALLS. Percentage of DB2 calls that are updates, calculated as

```
(Total Update Calls × 100) ÷ Total DB2 Calls
```

Job Control Statements

IRUF summarization is a two-step procedure (as shown in the JCL example on page 3-16). STEP1 sorts the IRUF by customer ID, transaction code, and LTERM sequence. Any IBM-compatible SORT program can be executed. STEP2 executes the TASCOSTR program to summarize the IRUF.

Table 3-2 describes the JCL statements required for TASCOSTR execution.

Table 3-2 TASCOSTR JCL Statements (Part 1 of 2)

Statement	Function
JOB	Initiates the job.
Sort Procedure:	
STEP1 EXEC	Specifies the name of an IBM-compatible SORT program for batch execution and the size of the region required to run the program.
SYSOUT DD	Defines the output class.
SORTLIB DD	Defines the program library containing sort load modules (site-dependent installation).
SORTIN DD	Defines the data (IRUF) to be sorted.
SORTOUT DD	Defines the data set for the sorted output.
SORTMSG DD	Defines the data set for the SORT messages.
SORTWK*nn* DD	Defines work data sets for data sorting; *nn* is a numeric.
SYSIN	Defines the SORT utility control statement. The record fields that must be sorted are as follows: Customer ID Transaction Code: Field 9, length of 26 bytes, character format, ascending sequence. LTERM Name: Field 41, length of 8 bytes, character format, ascending sequence.
Summarization Procedure:	
STEP2 EXEC	Specifies the name of the MVIMS summarization program as PGM=TASCOSTR Also specifies the region required to run the program and the PARM parameters required to define the summarization processing mode, the passing of control to a user exit routine, and alternate response times (see “PARM Options in the EXEC Statement” on page 3-17). **Note:** TASCOSTR loads and executes a supplied user exit routine that accesses a summarized IRUF. For more information about the exit routine, see *MAINVIEW for IMS Offline – Customization and Utilities Guide*.
STEPLIB DD	Defines the program library (IMF.LOAD) that contains the TASCOSTR load module.

Table 3-2 TASCOSTR JCL Statements (Part 2 of 2)

Statement	Function
RESUTIL DD	Defines the sorted IRUF as input to the summarization process. The DCB attributes of the data set are RECFM=VBS,LRECL=30970, BLKSIZE=30974.
DETCOSTS DD	Contains the summarized version of the IRUF. The characteristics can be the same as those defined in RESUTIL above. The DCB parameters for the DETCOSTS file must match those of the input IRUF.
DISTREPT DD	Contains the Total IMS Resource Usage Analysis report. The characteristics of the data set are RECFM=FBA,LRECL=133. BLKSIZE must be specified explicitly.
LISTRREP DD	Contains the Control Level Parameter report with response thresholds. The characteristics of the data set are RECFM=FB,LRECL=133. BLKSIZE must be specified explicitly.
ERRORS DD	Contains the Parameter File Error report, which provides diagnostic messages that are produced during report control statement verification when an error is encountered. The characteristics of the data set are RECFM=FB,LRECL=133. BLKSIZE must be specified explicitly.
SYSOUT DD	Defines the output class.

LISTRCNT DD	Contains report control statements and optional response threshold control statements. There is only one required report control statement. This statement ensures correct summarization and is specified as follows:
	`//LISTRCNT DD *`
	`CR010118`
	`/*`
	Response thresholds can also be defined, as follows:
	`//LISTRCNT DD *`
	`CR010118`
	`RR00200003000060001199999`
	`/*`
	For a detailed description of these control statements, see the “Response Threshold Definition” section of the *MAINVIEW for IMS Offline – Customization and Utilities Guide*.

Figure 3-5 Sample TASCOSTR JCL

```
//JOBNAME  JOB  ..........
//*****************
//** SORT THE IRUF INTO CUSTOMER ID SEQUENCE
//*****************
//STEP1    EXEC PGM=SORT,REGION=2048K
//SYSOUT   DD   SYSOUT=A
//SORTLIB  DD   DSN=SYS1.SORTLIB,DISP=SHR
//SORTIN   DD   DSN=IRUF.MONTHS,DISP=SHR
//SORTOUT  DD   DSN=&TEMP1,DISP=(,PASS),UNIT=SYSDA,
//              SPACE=(CYL,(20,5)),
//              DCB=(RECFM=VBS,LRECL=30970,BLKSIZE=30974)
//SORTMSG  DD   SYSOUT=A
//SORTWK01 DD   SPACE=(CYL,20),UNIT=SYSDA
//SORTWK02 DD   SPACE=(CYL,20),UNIT=SYSDA
//SORTWK03 DD   SPACE=(CYL,20),UNIT=SYSDA
//SORTWK04 DD   SPACE=(CYL,20),UNIT=SYSDA
//SORTWK05 DD   SPACE=(CYL,20),UNIT=SYSDA
//SORTWK06 DD   SPACE=(CYL,20),UNIT=SYSDA
//SYSIN    DD   *
   SORT FIELDS=(9,26,CH,A,41,8,CH,A)
//*
//***************
//** EXECUTE THE IRUF SUMMARIZATION
//***************
//STEP2    EXEC PGM=TASCOSTR,REGION=2048K,
//              PARM='SUMM,EXIT,R'
//STEPLIB  DD   DSN=IMF.LOAD,DISP=SHR
//RESUTIL  DD   DSN=&TEMP1,DISP=(OLD,DELETE),
//              DCB=BLKSIZE=6644
//DETCOSTS DD   DSN=IRUF.SUMM.MONTHS,DISP=(NEW,KEEP),
//              UNIT=TAPE,
//              DCB=(RECFM=VBS,LRECL=30970,BLKSIZE=30974)
//DISTREPT DD   SYSOUT=A,DCB=BLKSIZE=133
//LISTRREP DD   SYSOUT=A,DCB=BLKSIZE=133
//ERRORS   DD   SYSOUT=A,DCB=BLKSIZE=133
//SYSOUT   DD   SYSOUT=A
//LISTRCNT DD   DSN=IMF.CONTROL.PARMS,DISP=SHR
//
```

PARM Options in the EXEC Statement

The TASCOSTR EXEC statement PARM options can be used to define

- processing mode
- user exit specification
- response option
- suppression option
- MVIMS 3.2 compatible format option

The options are enclosed in single quotation marks and can be separated by a comma or a blank space (commas are shown as the separators in the following sections).

Processing Mode

In the Performance Reporter, TASCOSTR executes only in SUMM mode.

PARM Positions	Option
01 – 04	SUMM SUMM specifies full summarization and IMS usage report (no other option).

User Exit Specification

If specified, a user-written exit routine can be given control during TASCOSTR processing (see *MAINVIEW for IMS Offline – Customization and Utilities Guide* for more information).

PARM Positions	Options
05 – 09	,EXIT | ,NOEX EXIT User exit is given control. NOEX User exit is not given control (default).

Response Option

If specified, this parameter requests the alternate response time (TAR R RESPONSE). Only transactions that made a response to the originating terminal will be counted. If this parameter is not used, the normal response time (INPUT QUEUE TIME + ELAPSED TIME) is summarized. (For more information, see "User-Generated Response Time Segments" in the *MAINVIEW for IMS Offline – Customization and Utilities Guide*.)

PARM Positions	Option
10 – 11	,R R specifies the use of the alternate response time. **Note:** PARM positions 1 through 10 must be included.

Suppression Option

If specified, this parameter requests suppression of return code 140.

PARM Positions	Option
12 – 18	,SUP140 SUP140 specifies suppression of return code 140.

MVIMS 3.2 Compatible Format Option

When the IMFLEP00 parameter CMPFMT32 is set to YES, IRUF records are created in the MVIMS version 3.2 format. If specified in the TASCOSTR EXEC statement, the CMPFMT32 parameter processes the 3.2-formatted IRUF records and creates a DETCOSTS output file in the 3.2 format. (For more information about the CMPFMT32 parameter, see the Log Edit chapter in the *MAINVIEW for IMS Offline – Customization and Utilities Guide*.)

PARM Positions	Option
19 – 27	,CMPFMT32 CMPFMT32 specifies use of the MVIMS version 3.2 TASCOSTR routines.

Note: The CMPFMT32 parameter is provided so that users who do not include LTERM name as part of the customer ID can continue to perform IRUF summarization as they did with MVIMS version 3.2. Without the CMPFMT32 option in the TASCOSTR EXEC statement, TASCOSTR can process records created with the IMFLEP00 CMPFMT32=YES option, but customer IDs that do not include an LTERM name will not be processed properly and the DETCOSTS output file will be in the MVIMS version 3.3 format.

If the CMPFMT32 option is included in the TASCOSTR EXEC statement, the IRUF must have been created with CMPFMT32=YES in IMFLEP00.

PARM Options Example

The following parameters for the TASCOSTR EXEC statement summarize the IRUF and print the Total IMS Resource Usage Analysis report.
No control is given to a user exit. Alternate response time is not used, and return code 140 is not suppressed.

```
PARM='SUMM,NOEX'
```

Return Codes

This section describes the return codes that indicate the results of TASCOSTR execution.

Code	Explanation
016	An error was detected during control statement verification (see the diagnostic messages produced by the parameter file error report).
028	An error was detected during PARM parameter processing. The first parameter specified must be SUMM. The second parameter must be EXIT or NOEX (the default).
040	No detail IRUF record was read by the program (possible empty data set).
136	The input IRUF was not in sequence by transaction code within customer ID.
140	If the CMPFMT32 parameter was specified in the TASCOSTR EXEC statement (see page 3-18), database, terminal, or response data was combined on transaction accounting records during summarization by customer ID and transaction name (because only 50 segments are allowed). Summarization by segment occurs as follows: DBD segment (TYPE=D) — DBD name organization type DB2 segment (TYPE=E) — DB2 application plan name PCB segment (TYPE=P) — Terminal name Response segment (TYPE=R) — Transaction category **Note:** The most common cause of return code 140 is not retaining LTERM as part of the customer ID. Additional information is provided in the *MAINVIEW for IMS Offline – Customization and Utilities Guide* in the sections covering the MVIMS customer ID and IRUF summarization considerations.

Chapter 4 Message Region Utilization Analysis Reports (PRSREGUT)

Message Region Utilization Analysis (PRSREGUT) reports contain information about message region activity, transaction and program processing by region ID, and the amount of storage used within a region's available space. You can use the reports created by PRSREGUT to evaluate message region use, message region allocations, class use, queue backlogs, and program activity.

Objectives:

- Identify inactive message regions.
- Identify each region event as it occurs, including program start, transaction start, and program end.
- Quantify the work processed in each message region.
- Quantify the work processed in each message region by class.
- Quantify transaction input queue backups at transaction and program startup.
- Quantify the distribution of main storage used in each message region.

Uses:

- Define the IMS configuration with the most effective number of concurrently executing message regions.
- Establish more effective message region size requirements.
- Trace the processing activity of the message regions for problem tracking.
- Establish more effective class definitions and processing limits.

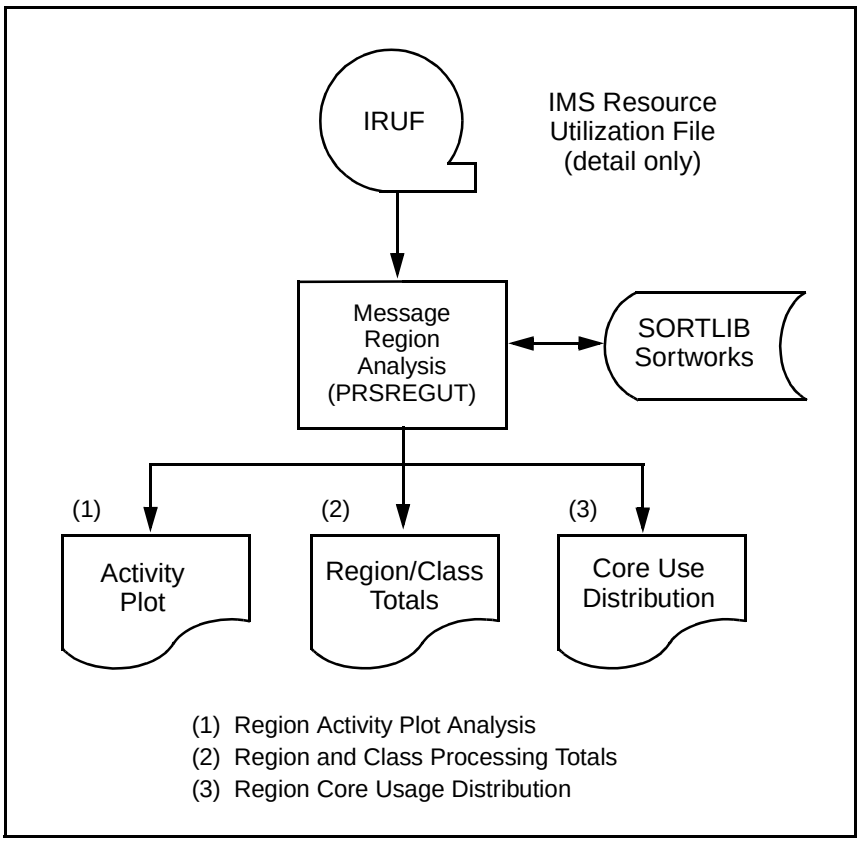
Input and Output

Input to the Message Region Utilization Analysis report program (PRSREGUT) is the detail IRUF. Output is a summarization of the message region activity and use. The following three reports are created:

- Region Activity Plot (optional)
- Region Processing Totals and Class/Rtcode Statistics
- Region Core Usage Distribution

Figure 4-1 shows the system flow for PRSREGUT.

Figure 4-1 PRSREGUT System Flow



Report Element Descriptions

This section describes the elements in each of the PRSREGUT Message Region Utilization Analysis reports.

Region Activity Plot

DBCTL Threads:

DBCTL CICS and ODBA thread activity can be reported by PRSREGUT. The following considerations apply:

- CICS=YES or CICS=OFFLINE must be specified for the Event Collector in BBPARM member IMFECP00.
- Message region CPU time for DBCTL threads represents only the CPU time used to process the DL/I calls.
- Each CICS and ODBA region is represented in a single column, even if the region had multiple DBCTL threads active simultaneously.

  Warning! If one CICS or ODBA region has more than one DBCTL thread active at a time, the column for that CICS region is not valid because multiple thread activity is shown as one plot.

Figure 4-2 on page 4-4 provides an example of the Region Activity Plot report.

Figure 4-2 Region Activity Plot

```
**** IMF ****                                  IMS PERFORMANCE REPORTER                                          **** IMF ****
CURRENT DATE - 03/22/yy <1>                  MESSAGE REGION UTILIZATION ANALYSIS (WITH RESPONSE OPTION)          PAGE NO.    1
REPORTING RANGE REQUESTED yy.350 00.01 TO yy.350 23.59 <2>          <3> ACTUAL REPORTING RANGE FOUND yy.350 05.41 TO yy.350 05.43
*************************************************************************************************************************************
*       <4>     *       <5>       *    <6>    *           *           *           *           *           *           *           *
*               *      MESSAGE    * REGION ID * REGION ID * REGION ID *    N/A    *    N/A    *    N/A    *    N/A    *    N/A    *
*  ACTION TIME  *       QUEUE     *  1      K *  1      K *  1      K *           *           *           *           *           *
*  HH.MM.SS.HS  *      BACKLOG    *  A17MR102 *  A17MR100 *  A17MR101 *           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *
*************************************************************************************************************************************
*               *                 *           *           *           *           *           *           *           *
*                                                                                                                                   *
*                                                  REGION ACTIVITY PLOT                                                             *
*                                                                                                                                   *
*    91.152                                                                                                                         *
*                                                                                                                                   *
*               *                 *    <7>    *           *           *           *           *           *           *           *
*  05.41.38.76  *           0     * #KIN9Z01  *           *           *           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *           *
*  05.41.38.83  *           0     * .KIN9Z01  *           *           *           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *           *
*  05.42.19.06  *           1     *           * #KNV9Z41  *           *           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *           *
*  05.42.19.12  *           0     *           *  KNV9Z3BS *           *           *           *           *           *           *
*   SAME TIME   *           0     *           *       0(0)*           *           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *           *
*  05.42.19.24  *           0     *           * .KNV9Z41  *           *           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *           *
*  05.42.37.90  *           1     *           *           * #KUM9Z80  *           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *           *
*  05.42.38.15  *           0     *           *           *  KUM9Z380 *           *           *           *           *           *
*   SAME TIME   *           0     *           *           *       0(0)*           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *           *
*  05.42.38.26  *           0     *           *           * .KUM9Z80  *           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *           *
*  05.42.38.34  *           1     * #KUM9Z80  *           *           *           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *           *
*  05.42.38.35  *           0     *  KUM9Z380 *           *           *           *           *           *           *           *
*   SAME TIME   *           0     *       0(0)*           *           *           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *           *
*  05.42.38.41  *           0     * .KUM9Z80  *           *           *           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *           *
*  05.42.41.25  *           1     *           * #KUM5A80  *           *           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *           *
*  05.42.41.43  *           0     *           *  KUM5A380 *           *           *           *           *           *           *
*   SAME TIME   *           0     *           *       0(0)*           *           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *           *
*  05.42.41.49  *           0     *           * .KUM5A80  *           *           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *           *
*  05.42.42.02  *           1     *           *           * #KUM9Z80  *           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *           *
*  05.42.42.08  *           0     *           *           *  KUM9Z380 *           *           *           *           *           *
*   SAME TIME   *           0     *           *           *       0(0)*           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *           *
*  05.42.42.14  *           0     *           *           * .KUM9Z80  *           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *           *
*  05.42.43.21  *           0     * #KUM9Z80  *           *           *           *           *           *           *           *
*   SAME TIME   *           0     *  KUM9Z380 *           *           *           *           *           *           *           *
*   SAME TIME   *           0     *       0(0)*           *           *           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *           *
*  05.42.43.27  *           0     * .KUM9Z80  *           *           *           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *           *
*  05.42.44.42  *           0     *           * #KNV9Z41  *           *           *           *           *           *           *
*   SAME TIME   *           0     *           *  KNV9Z3BS *           *           *           *           *           *           *
*   SAME TIME   *           0     *           *       0(0)*           *           *           *           *           *           *
*               *                 *           *           *           *           *           *           *           *           *
```

Table 4-1 describes Region Activity Plot report elements. The reference numbers (with the **<n>** format) match the elements in the report example to the elements described in the table.

Table 4-1 Region Activity Plot Report Elements (Part 1 of 2)

<1> CURRENT DATE

Date this report was generated, in mm/dd/yy format.

<2> REPORTING RANGE REQUESTED

Time range requested for this message region analysis. This range is the same as the range specified in the parameter input data. If the time range selection was not specified, this range is set to equal the ACTUAL REPORTING RANGE FOUND. The range is expressed as the lowest date (yy.ddd) and time (hh.mm) requested through the highest date (yy.ddd) and time (hh.mm) requested.

<3> ACTION REPORTING RANGE FOUND

Time range encountered for this message region analysis. This range is expressed as the lowest date (yy.ddd) and time (hh.mm) found in the data selected for reporting through the highest date (yy.ddd) and time (hh.mm) found in the data selected.

<4> ACTUAL TIME HH.MM.SS.HS

Time of occurrence for the activity represented in the message region slots. This time is expressed as hours, minutes, seconds, and hundredths of seconds (hh.mm.ss.hs). When a change in Julian date is encountered, a separate line is printed indicating the Julian date (yy.ddd) for the succeeding sample times.

Note: If the response option is in effect, WITH RESPONSE OPTION will appear after the report title in the second line.

<5> MESSAGE QUEUE BACKLOG

Time range encountered for this message region analysis. This range is expressed as the lowest date (yy.ddd) and time (hh.mm) found in the data selected for reporting through the highest date (yy.ddd) and time (hh.mm) found in the data selected.

<6> REGION ID

Identification code for the message region being reported, which is

```
s   nnnK
xxxxxxxx
```

s	system identification
nnnK	net storage available in the dependent region for a message processing program
xxxxxxxx	name of the message region

If N/A appears in this header area, the column is not applicable to this analysis.

If .BMPREG. appears as the name of this message region, the plot BMP option is not specified and all BMP/JBP/FPU activity is grouped and reported in this single message region slot.

Table 4-1 Region Activity Plot Report Elements (Part 2 of 2)

<7> REGION STATUS

The message region activity that occurred at this time.

Note: If Event Collector option BMP=NO is specified, no BMP or JBP regions can be shown. For more information, see Chapter 2, “Event Collector Options.”

Message region activity can be any of the following events:

blank	No start/end actions.
#pppppppp	Program started in the message region and has the name pppppppp. A number sign prefix (#) indicates program start.
.pppppppp	Program ended in the message region and has the name pppppppp. A period prefix indicates program end.
ttttttt	Transaction started. A blank character prefix indicates transaction start.
pn(tn)	For the first transaction processed in this program's scheduling queue, counts are derived as follows:

pn	Number of transactions that are queued to this program. The count does not include this scheduled transaction.
tn	Number of queued transactions that have the same transaction code. The count does not include this scheduled transaction.

Region Processing Totals and Class/Rtcode Processing Statistics

DBCTL Threads:

DBCTL CICS and ODBA thread activity can be reported by PRSREGUT. The following considerations apply:

- CICS=YES or CICS=OFFLINE must be specified for the Event Collector in BBPARM member IMFECP00.
- Message region CPU time for DBCTL threads represents only the CPU time used to process the DL/I calls.
- Each CICS region is represented in a single column, even if the region had multiple DBCTL threads active simultaneously.
- In the class processing section, DBCTL thread transactions are in class 0.

Figure 4-3 provides an example of the Region Processing Totals and Class/Rtcode Processing Statistics report.

Figure 4-3 Region and Class/Rtcode Processing Statistics

```
**** IMF ****                                IMS PERFORMANCE REPORTER                                          **** IMF ****
CURRENT DATE - 03/22/yy <1>                MESSAGE REGION UTILIZATION ANALYSIS (WITH RESPONSE OPTION)          PAGE NO.    2
REPORTING RANGE REQUESTED yy.350 00.01 TO yy.350 23.59 <2>          <3> ACTUAL REPORTING RANGE FOUND yy.350 05.41 TO yy.350 05.43
*************************************************************************************************************************
*                               *           *           *           *           *           *           *           *           *
*                               * REGION ID * REGION ID * REGION ID *    N/A    *    N/A    *    N/A    *    N/A    *    N/A    *
*                               *  1      K *  1      K *  1      K *           *           *           *           *           *
*     CATEGORIES                *  A17MR102 *  A17MR100 *  A17MR101 *           *           *           *           *           *
*                               *           *           *           *           *           *           *           *           *
*************************************************************************************************************************
*                               *           *           *           *           *           *           *           *           *
*                                                                                                                           *
*                                                  REGION PROCESSING TOTALS                                                 *
*                                                                                                                           *
* <4>                           *           *           *           *           *           *           *           *           *
* NUMBER OF PROGRAMS SCHEDULED  *         5 *         4 *         4 *           *           *           *           *           *
* <5>                           *           *           *           *           *           *           *           *           *
* NUMBER OF TRANSACTIONS PROCESSED *        4 *         4 *         4 *           *           *           *           *           *
* <6>                           *           *           *           *           *           *           *           *           *
* ELAPSED PROGRAM RESIDENCY TIME *  00.00.00 *  00.00.01 *  00.00.01 *           *           *           *           *           *
* <7>                           *           *           *           *           *           *           *           *           *
* ELAPSED TRANSACTION PROCESS TIME *  00.00.00 *  00.00.01 *  00.00.00 *           *           *           *           *           *
*                               *           *           *           *           *           *           *           *           *
*************************************************************************************************************************
*                                                                                                                           *
*                                              CLASS/RTCODE PROCESSING STATISTICS                                           *
*                                                                                                                           *
*                               *           *           *           *           *           *           *           *           *
* TRANSACTION COUNT-CLASS 001 <8> *         4 *         4 *         4 *           *           *           *           *           *
* TRANSACTION  TIME-CLASS 001 <9> *  00.00.00 *  00.00.01 *  00.00.00 *           *           *           *           *           *
*************************************************************************************************************************
```

Table 4-2 describes Region and Class Processing Statistics report elements. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 4-2 Region and Class/Rtcode Processing Statistics Report Elements

<1> CURRENT DATE Date this report was generated, in mm/dd/yy format.
<2> REPORTING RANGE REQUESTED Time range requested for this message region analysis. This range is the same as the range specified in the parameter input data. If the time range selection was not specified, this range is set to equal the ACTUAL REPORTING RANGE FOUND. The range is expressed as the lowest date (yy.ddd) and time (hh.mm) requested through the highest date (yy.ddd) and time (hh.mm) requested.
<3> ACTUAL REPORTING RANGE FOUND Time range encountered for this message region analysis. This range is expressed as the lowest date (yy.ddd) and time (hh.mm) found in the data selected for reporting through the highest date (yy.ddd) and time (hh.mm) found in the data selected.
<4> NUMBER OF PROGRAMS SCHEDULED Number of programs scheduled for execution in the message region for the specified time range.
<5> NUMBER OF TRANSACTIONS PROCESSED Number of transactions processed by programs in the message region for the specified time range.
<6> ELAPSED PROGRAM RESIDENCY TIME Amount of time the message region was active processing application programs. This value is a sum of the elapsed times of all programs scheduled in the message region. The time is expressed in hours, minutes, and seconds (hhh.mm.ss).
<7> ELAPSED TRANSACTION PROCESS TIME Amount of time the message region was actively processing transactions. This value is a sum of the elapsed execution times of all transactions processed in the message region. The time is expressed in hours, minutes, and seconds (hhh.mm.ss).
<8> TRANSACTION COUNT - CLASS *nnn* Number of transactions processed in this message region scheduled with the class value *nnn*. For Fast Path message-driven transactions, the routing code will be printed instead. **Note:** All DBCTL threads are in class 0.
<9> TRANSACTION TIME - CLASS *nnn* Amount of time this message region was actively processing transactions scheduled with the class value *nnn*. This value is a sum of the elapsed execution times of all transactions processed with class *nnn* in this region. The time is expressed in hours, minutes, and seconds (hhh.mm.ss). For Fast Path message-driven transactions, the routing code will be printed instead. **Note:** All DBCTL threads are in class 0.

Note: In cases of multisegment conversational transactions, transaction elapsed time can exceed program residency time. If you have questions in this area, please contact BMC Software.

Region Core Usage Distribution

DBCTL Threads:

DBCTL CICS and ODBA thread activity can be reported by PRSREGUT Message Region Utilization reports. The following considerations apply:

- CICS=YES or CICS=OFFLINE must be specified for the Event Collector in BBPARM member IMFECP00.
- Message region CPU time for DBCTL threads represents only the CPU time used to process the DL/I calls.
- Each CICS region is represented in a single column, even if the region had multiple DBCTL threads active simultaneously.
- DBCTL transactions always have a zero percent core utilization, because the core usage value is zero.

Figure 4-4 provides an example of the Region Core Usage Distribution report.

Figure 4-4 Region Core Usage Distribution Report

```
**** IMF ****                                    IMS PERFORMANCE REPORTER                                                  **** IMF ****
CURRENT DATE - 03/22/yy <1>                   MESSAGE REGION UTILIZATION ANALYSIS (WITH RESPONSE OPTION)                  PAGE NO.    3
REPORTING RANGE REQUESTED yy.350 00.01 TO yy.350 23.59 <2>           <3> ACTUAL REPORTING RANGE FOUND yy.350 05.41 TO yy.350 05.43
*************************************************************************************************************************************
*                                *           *           *           *           *           *           *           *           *
*                                * REGION ID * REGION ID * REGION ID *    N/A    *    N/A    *    N/A    *    N/A    *    N/A    *
*                                *  1      K *  1      K *  1      K *           *           *           *           *           *
*     CATEGORIES                 *  A17MR102 *  A17MR100 *  A17MR101 *           *           *           *           *           *
*                                *           *           *           *           *           *           *           *           *
*************************************************************************************************************************************
*                                *           *           *           *           *           *           *           *           *
*                                                                                                                                   *
*                                                    REGION CORE USAGE DISTRIBUTION                                                 *
*  <4>                             <5>                                                                                              *
* PERCENTAGE OF REGION CORE USED * NO PROGS  * NO PROGS  * NO PROGS  *    N/A    *    N/A    *    N/A    *    N/A    *    N/A    *
*                                *           *           *           *           *           *           *           *           *
*            100                 *           *           *           *           *           *           *           *           *
*                                *           *           *           *           *           *           *           *           *
*          90 - 99               *           *           *           *           *           *           *           *           *
*                                *           *           *           *           *           *           *           *           *
*          80 - 89               *           *           *           *           *           *           *           *           *
*                                *           *           *           *           *           *           *           *           *
*          70 - 79               *           *           *           *           *           *           *           *           *
*                                *           *           *           *           *           *           *           *           *
*          60 - 69               *           *           *           *           *           *           *           *           *
*                                *           *           *           *           *           *           *           *           *
*          50 - 59               *           *           *           *           *           *           *           *           *
*                                *           *           *           *           *           *           *           *           *
*          40 - 49               *           *           *           *           *           *           *           *           *
*                                *           *           *           *           *           *           *           *           *
*          30 - 39               *           *           *           *           *           *           *           *           *
*                                *           *           *           *           *           *           *           *           *
*          20 - 29               *           *           *           *           *           *           *           *           *
*                                *           *           *           *           *           *           *           *           *
*          10 - 19               *           *           *           *           *           *           *           *           *
*                                *           *           *           *           *           *           *           *           *
*          00 - 09               *         5 *         4 *         4 *           *           *           *           *           *
*                                *           *           *           *           *           *           *           *           *
*************************************************************************************************************************************
```

Table 4-3 describes Region Core Usage Distribution report elements. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 4-3 Region Core Usage Distribution Report Elements

<1> CURRENT DATE Date this report was generated, in mm/dd/yy format.
<2> REPORTING RANGE REQUESTED Time range requested for this message region analysis. This range is the same as the range specified in the parameter input data. If the time range selection was not specified, this range is set to equal the ACTUAL REPORTING RANGE FOUND. The range is expressed as the lowest date (yy.ddd) and time (hh.mm) requested through the highest date (yy.ddd) and time (hh.mm) requested.
<3> ACTUAL REPORTING RANGE FOUND Time range encountered for this message region analysis. This range is expressed as the lowest date (yy.ddd) and time (hh.mm) found in the data selected for reporting through the highest date (yy.ddd) and time (hh.mm) found in the data selected.
<4> PERCENTAGE OF REGION CORE USED Represents the distribution of percentages of how the message region's region size was used. The group identified as 80 - 89 is the range of region size used from 80 percent up through 89 percent. **Note:** For DBCTL threads, core usage is zero.
<5> NO PROGS Count of the number of programs that utilized some percentage range of the message region's region size. When the NO PROGS count is 20 and percentage range is 50 - 59, this count is interpreted to mean 20 programs scheduled in this message region used from 50 to 59 percent of the region's available space.

Job Control Statements

This section describes the JCL statements required to execute the PRSREGUT program. Figure 4-5 on page 4-12 provides a JCL example.

Table 4-4 PRSREGUT JCL Statements

Statement	Function
JOB	Initiates the job.
EXEC	Specifies the program name of the region analysis process as PGM=PRSREGUT Also specifies the region required and the PARM parameters required to define a time period, system ID, internal sort size; and the Region Activity Plot (see "PARM Options in the EXEC Statement" on page 4-13). The region requirement can be affected by • block size of the IRUF • number of buffers specified for the data sets • internal sort size requirements
STEPLIB DD	Defines the program library (IMF.LOAD) that contains the PRSREGUT program load module.
RESUTIL DD	Defines the detail IRUF that is used as input for this analysis. The data set DCB attributes are RECFM=VBS,LRECL=30970,BLKSIZE=30974.
REGPLOT1 DD	Defines the print data set for the message region analysis reports. The characteristics of the data set are RECFM=FBA,LRECL=133. BLKSIZE must be specified explicitly.
REGSELEC DD	Defines report control statements, which are described on page 4-16. If the DSN parameter is used to define the data set, the data set characteristics are RECFM=FB,LRECL=80. BLKSIZE must be specified explicitly.
SORTLIB DD	Defines the library for the modules loaded by an internally invoked sort program.
SYSOUT DD	Defines the output class.
SORTWK*nn* DD	Defines work data sets for data sorting; *nn* is a numeric.

Figure 4-5 provides an example of JCL for PRSREGUT.

Figure 4-5 Sample JCL for PRSREGUT

```
//JOBNAME  JOB  ............
//STEP1    EXEC PGM=PRSREGUT,REGION=192K,
//              PARM='95010,0800,95010,1600,*,350000,NM'
//STEPLIB  DD   DSN=IMF.LOAD,DISP=SHR
//RESUTIL  DD   DSN=IRUF.MONTHS,DISP=SHR,
//              DCB=(RECFM=VBS,LRECL=30970,BLKSIZE=30974)
//REGPLOT1 DD   SYSOUT=A,DCB=BLKSIZE=133
//REGSELEC DD   *
REG *MESREG01 AMESREG09
REG AMESREG08 AMESREG07 *MESREGZZ
/*
//SORTLIB  DD   DSN=SYS1.SORTLIB,DISP=SHR
//SYSOUT   DD   SYSOUT=A
//SORTWK01 DD   UNIT=SYSDA,SPACE=(CYL,(20))
//SORTWK02 DD   UNIT=SYSDA,SPACE=(CYL,(20))
//SORTWK03 DD   UNIT=SYSDA,SPACE=(CYL,(20))
//
```

PARM Options in the EXEC Statement

The PRSREGUT EXEC statement PARM options can be used to define

- time period selection
- system ID selection
- sort size for the internal sort
- plot data option
- plot BMP option
- response option

Time Period Selection

This option defines the range of time to be selected for this reporting process. The range is specified as the lowest Julian date (yyddd) and time (hhmm) to the highest Julian date (yyddd) and time (hhmm).

PARM Positions	Options
01 – 21	ldate,ltme,hdate,htme ldate Low Julian date in yyddd format. ltme Low hour/minute in hhmm format. hdate High Julian date in yyddd format. htme High hour/minute in hhmm format.

The value 00000,0000,00000,0000 specifies that the time period selection is not to be invoked.

System ID Selection

This PARM option defines the computing system to be reported.

PARM Positions	Options
22 – 23	,x | ,* x System ID to be selected. * System ID selection is not to be invoked.

Sort Size for the Internal Sort

This option is a six-digit number that specifies the amount of storage for the internal sorting process (from 018000 bytes up to the maximum available main storage).

PARM Positions	Options
24 – 30	,nnnnnn | ,350000 nnnnnn Sort storage size. 350000 Sort storage size default of 350,000 bytes of storage.

Plot Data Option

This option specifies whether the Region Activity Plot report is generated, in addition to the three quantitative reports (Region Processing Totals, Class Processing Statistics, and Region Core Usage Distribution). Depending on the time period selected, including the Region Activity Plot can produce a very voluminous report. Usually, only a few minutes are selected for the time period.

PARM Positions	Options
31 – 32	,Y | ,N Y Plot is generated. N Plot is not generated (the default).

Plot BMP Option

This option specifies the region types to be reported.

PARM Positions	Options
33	B | M B Processes BMP/JBP/FPU activity using actual region IDs. M Merges all processed BMP/JBP/FPU activity with the pseudo region ID of BMPREG. All BMP/JBP/FPU activity is merged into the pseudo region ID and reported in the eighth region column (the default).

Response Option

This option specifies whether to use the actual arrival time on the queue for message switch transactions in the Region Activity Plot (invalid if IRUF was not created with the response option).

PARM Positions	Options
34 – 35	,R R Specifies the use of message switch arrival times. If this parameter is not specified, the arrival time of the originating transaction is used.

PARM Options Example

The following example requests a message region analysis for day 02.076 from 8:00 A.M. to 4:00 P.M. All system IDs (*) are to be selected. The internal sort is to be passed a storage size of 100000. The Region Activity Plot is to be generated (Y) and BMP/JBP activity merged (M) and reported on in the pseudo region (.BMPREG.). Message switch arrival times are to be used (R).

```
PARM='02076,0800,02076,1600,*,100000,YM,R'
```

Report Control Statements

Message region analysis can be reported either by specific regions or by the first seven unique message regions.

The statement position identifies the message region to be selected for region analysis reporting, as shown in Table 4-5.

Table 4-5 Report Statement Syntax – Message Region Utilization

Position	Input
01 – 03	Statement ID: REG
04	Blank
05 – 13	Message region identifier 1 Each identifier must be unique. The format is as follows: First position — System ID where message region operates. Use an asterisk to access all systems. Next 8 positions — Message region name, left-justified. If the name is not eight characters long, it must be padded with blanks at the end (for example, MESREG*bb*; where, *b* represents a blank character).
14	Blank
15 – 23	Message region identifier 2 (same format as message region identifier 1)
24	Blank
25 – 33	Message region identifier 3 (same format as message region identifier 1)
34	Blank
35 – 43	Message region identifier 4 (same format as message region identifier 1)
44	Blank
45 – 53	Message region identifier 5 (same format as message region identifier 1)
54	Blank
55 – 63	Message region identifier 6 (same format as message region identifier 1)
64	Blank
65 – 73	Message region identifier 7 (same format as message region identifier 1)

The PRSREGUT default is to report the first seven uniquely named message regions.

The report control statements shown in the JCL example on page 4-12 request the reporting of activity in five message regions. In three of the message regions, only activity from system A is to be reported, while activity in message regions MESREG01 and MESREGZZ is to be reported for all active systems.

Return Codes

This section describes the return codes that indicate the results of PRSREGUT execution.

Code	Explanation
028	Invalid delimiter was found in the time period selection. A required comma is missing or was specified incorrectly.
032	Day is out of range (001-366) for the selection low date.
036	Time of day is out of range (0000-2359) for the selection low time.
040	Day is out of range (001-366) for the selection high date.
044	Time of day is out of range (0000-2359) for the selection high time.
048	High date/time selection (yyddd,hhmm) is less than the low date/time (yyddd,hhmm).
052	Invalid system ID delimiter was found. A required comma is missing or was specified incorrectly.
056	System identifier contains a blank or invalid identifier.
060	Invalid sort size delimiter was found. A required comma is missing or was specified incorrectly.
064	Sort size was specified incorrectly. The value given was either not six digits long, not numeric, or less than 18000.
068	Invalid plot data delimiter was found. A required comma is missing or incorrectly specified.
072	Response option was requested, but transaction accounting records that were not created with this option were found on the IRUF. (R OPTION does not indicate R in the transaction accounting record, which you can verify with the PRSPRINT utility. For more information, see the *MAINVIEW for IMS Offline – Customization and Utilities Guide*.)
076	Response option code was specified incorrectly.
084	Plot data specified was not one of the acceptable values of Y or N.
088	Error was detected in the region selection statement analysis. There was an error in statement format, or more than seven regions were selected.
090	BMP option specified was not M or B.
092	Internal sort returned with an unsuccessful status.
094	Number of program transactions exceeded the table maximum.
096	Summarized IRUF is not permitted as input.

Chapter 5 Program Processing Reports (PRSPSBRP, PRSPSB20)

You can use the program processing reports, PRSPSBRP and PRSPSB20, to evaluate and control overhead costs related to programs in use in IMS.

Objectives of Both Reports:

- Quantify program usage by frequency of use and resource consumption, including CPU, database calls, and I/O activity.
- Quantify program buffer/DMB pool usage.
- Quantify program virtual storage usage.
- Quantify program message activity.

Additional Objectives of the PRSPSBRP Report:

- Quantify transaction processing by transaction response times, queue wait times, and number of transactions processed per execution.
- Quantify the overhead incurred in the processing of the program, including open/close time, buffer handling time, and program scheduling time.

Uses of Both Reports:

- Define pool sizes (buffer/DMB).
- Set more effective processing limits.
- Identify programs that are processed most frequently and consume the most IMS system resources.
- Identify those programs that result in the highest Fast Path sync point failure percentage.

Additional Uses of the PRSPSBRP Report:

- Identify programs that result in degraded response times due to queue waits, excessive overhead timings, or high I/O requirements per request.
- Identify programs that result in the highest abend percentage.

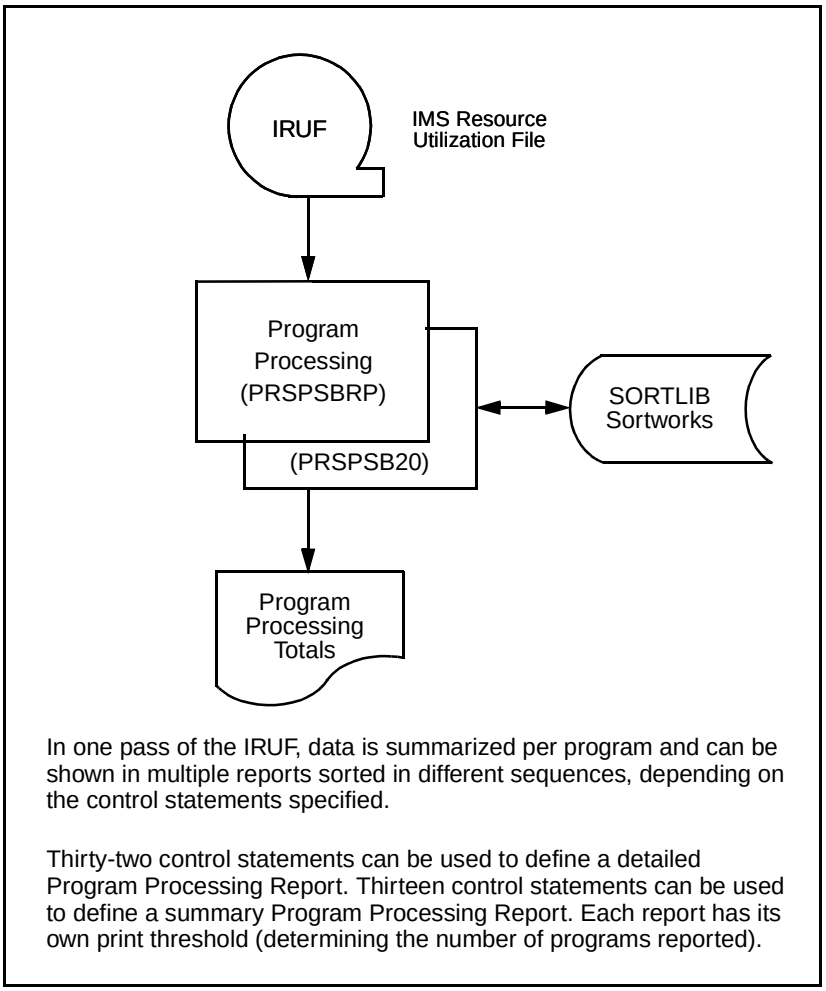
Input and Output

Program usage is analyzed by batch execution of either PRSPSBRP or PRSPSB20 against a detail or summarized IRUF file. These two programs produce program processing reports.

There are two types of reports, the Program (PSB) Processing Report and the Program (PSB20) Processing Report. The PSB report is produced by the PRSPSBRP report program. This report is a detailed analysis of factors that contribute to program elapsed time, such as database calls and the actual number of physical I/Os required to satisfy the DL/I or DB2 subsystem requests. CPU consumption is also broken down by message region and control region. The PSB20 report is produced by the PRSPSB20 report program. This report summarizes the important activity and resource data.

Figure 5-1 on page 5-3 shows the system flow for PRSPSBRP and PRSPSB20.

Figure 5-1 PRSPSBRP and PRSPSB20 System Flow



In one pass of the IRUF, data is summarized per program and can be shown in multiple reports sorted in different sequences, depending on the control statements specified.

Thirty-two control statements can be used to define a detailed Program Processing Report. Thirteen control statements can be used to define a summary Program Processing Report. Each report has its own print threshold (determining the number of programs reported).

Report Element Descriptions

This section describes the elements of the reports produced by PRSPSBRP and PRSPSB20. The presentation of the report elements depends on the report selected (see “Report Control Statements” on page 5-18). Quantities are sorted in descending order. For example, if number of programs executed is selected (see Code 2 in “PRSPSBRP Control Statement Report Codes” on page 5-20) the program that had the most executions appears first.
The control statements can be used to report, for example, the top 20 programs with the most executions or the 10 programs with the greatest percentage of abends.

Program (PSB) Processing Report

DBCTL Threads:

DBCTL CICS and ODBA thread activity can be reported by PRSPSBRP. The following considerations apply:

- CICS=YES or CICS=OFFLINE must be specified for the Event Collector in BBPARM member IMFECP00.
- Queue time, core used, DB2 CPU time, and DB2 requests are zero.
- Message region CPU time for DBCTL threads represents only the CPU time used to process the DL/I calls.
- The response time is zero if the response option is specified on the execution parameters (see “PARM Options in the EXEC Statement” on page 5-16).

  The response time is the transaction elapsed time if the response option is not chosen.
- No message queue calls are reported, because DBCTL threads do not use IMS message queues.

TPI Considerations:

TPI transactions that do not allocate a PSB do not have a PSB name, and they are not reported by PRSPSBRP or PRSPSB20.

Figure 5-2 on page 5-5 provides an example of the Program (PSB) Processing Report.

Figure 5-2 Program (PSB) Processing Report

```
**** IMF ****                                    IMS PERFORMANCE REPORTER                                          **** IMF ****
CURRENT DATE -  03/22/yy <1>                  PROGRAM(PSB) PROCESSING REPORT     (WITH RESPONSE OPTION)          PAGE NO.    1
TOTAL DB2 REQUESTS <2>                  REPORT NUMBER 32 <3>          <4> REPORT WILL HAVE FIRST  (ALL) PROGRAMS LISTED
REPORTING RANGE REQUESTED yy.350 00.01 TO yy.350 23.59 <5>            <6> ACTUAL REPORTING RANGE FOUND yy.350 05.41 TO yy.350 05.43
*************************************************************************************************************************************
* PROGRAM TYPE TRANS/EXEC  *     ELAPSED TIME     *  CORE   POOL   * PROG SCHED *     MESSAGE GET UNIQUES     *    DL/I REQUESTS   *
* LAST TRANS RESPONSE TIME *   MSG REG CPU TIME   *  ALOC    PSB   * BUF HANDLE *       MESSAGE INSERTS       *     ACTUAL I/O     *
*  NO. EXECS   QUEUE TIME  *    DL/I CPU TIME     *  USED    DMB   * OPEN/CLOSE *      MESSAGE GET NEXTS      *       NO I/O       *
*                          *      DB2 CPU TIME    * ABEND%  SFAIL% *             *                             *      DB2 REQUESTS  *
*              (AVERAGES)  * TOTAL HRS  AVG(SECS) *               * (SECONDS)  *    TOTAL   HIGH  AVG  LOW   *                    *
*************************************************************************************************************************************
*                                                                                                                                   *
* KIN9Z01   MPP    0.0     *    0.0000     0.000  *    0      3644 *      0.001 *         2     2     2     2 *                  0 *
*                  0.0     *    0.0000     0.000  *   14      6472 *      0.000 *         1     1     1     1 *                  0 *
*        1         0.0     *    0.0000     0.000  *  0.0       0.0 *      0.000 *         0     0     0     0 *                  0 *
*                          *    0.0000     0.000  *                *            *                               *                  0 *
* <7>       <9>                                                                                                                     *
* KNV5A41   MPP    1.0<11> *    0.0001<14> 0.520<15>   0<22>  5156<25>    0.001<28>       2<31> 2<32> 2<33> 2<34>            <43>1 *
* KNV5A3BS         0.6<12> *    0.0000<16> 0.012<17>  20<23> 11896<26>    0.000<29>       1<35> 1<36> 1<37> 1<38>            <44>0 *
* <8>    1 <10>    0.1<13> *    0.0000<18> 0.000<19> 0.0<24>   0.0<27>    0.000<30>       0<39> 0<40> 0<41> 0<42>            <45>3 *
*                          *    0.0000<20> 0.000<21>             *            *                               *                <46>0 *
*                                                                                                                                   *
* KNV9Z41   MPP    1.0     *    0.0003     0.307  *    0      5156 *      0.004 *         8     2     2     2 *                  2 *
* KNV9Z3BS         0.2     *    0.0000     0.011  *   20     11896 *      0.000 *         4     1     1     1 *                  2 *
*        4         0.0     *    0.0000     0.000  *  0.0       0.0 *      0.000 *         0     0     0     0 *                  4 *
*                          *    0.0000     0.000  *                *            *                               *                  0 *
*                                                                                                                                   *
* KUM5A80   MPP    1.0     *    0.0001     0.200  *    0     49196 *      0.024 *         4     2     2     2 *                  3 *
* KUM5A380         0.1     *    0.0000     0.018  *   18     36448 *      0.000 *         2     1     1     1 *                  0 *
*        2         0.1     *    0.0000     0.001  *  0.0       0.0 *      0.000 *         0     0     0     0 *                  6 *
*                          *    0.0000     0.000  *                *            *                               *                  0 *
*                                                                                                                                   *
* KUM9Z80   MPP    1.0     *    0.0001     0.152  *    0     49196 *      0.030 *         8     2     2     2 *                  6 *
* KUM9Z380         0.1     *    0.0000     0.019  *   18     36448 *      0.000 *         4     1     1     1 *                  2 *
*        4         0.0     *    0.0000     0.001  *  0.0       0.0 *      0.000 *         0     0     0     0 *                 10 *
*                          *    0.0000     0.000  *                *            *                               *                  0 *
*                                                                                                                                   *
* KUM9Z81   MPP    1.0     *    0.0000     0.150  *    0      2196 *      0.001 *         2     2     2     2 *                  0 *
* KUM9Z381         0.1     *    0.0000     0.011  *   10      2712 *      0.000 *         1     1     1     1 *                  0 *
*        1         0.0     *    0.0000     0.000  *  0.0       0.0 *      0.000 *         0     0     0     0 *                  0 *
*                          *    0.0000     0.000  *                *            *                               *                  0 *
*                                                                                                                                   *
*************************************************************************************************************************************
```

Table 5-1 describes Program Processing Report elements. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 5-1 Program (PSB) Processing Report Elements (Part 1 of 5)

<1> CURRENT DATE Date this report was generated, in mm/dd/yy format.
<2> subtitle Report subtitle, which can be user-specified (see “Report Control Statements” on page 5-18) or a default subtitle (40 characters maximum). The default subtitle is determined by the control statement report code. One report is created for each control statement. Multiple reports are printed in descending sequence by report code. If report code 01 is selected, however, it is always printed first. Report code 01 produces an alphabetic listing.
<3> REPORT NUMBER *xx* The variable *xx* is the report code specified in the report control statement.
<4> REPORT WILL HAVE FIRST *nnnn* PROGRAMS LISTED Defines the print limit request specified for this report.
<5> REPORTING RANGE REQUESTED Time range requested for this program usage analysis. This range is the same as the range specified in the parameter input data. If the time range selection was not specified, this range is set to equal the ACTUAL REPORTING RANGE FOUND. The range is expressed as the lowest date (yy.ddd) and time (hh.mm) requested through the highest date (yy.ddd) and time (hh.mm) requested.
<6> ACTUAL REPORTING RANGE FOUND Time range encountered for this program usage analysis. This range is expressed as the lowest date (yy.ddd) and time (hh.mm) found in the data selected for reporting through the highest date (yy.ddd) and time (hh.mm) found in the data selected.
<7> PROGRAM NAME Name of the program being reported.
<8> LAST TRANS Name of the last transaction processed by this program during the analysis period. If the response option is in effect, WITH RESPONSE OPTION appears after the report title in the second line.

Table 5-1 Program (PSB) Processing Report Elements (Part 2 of 5)

<9> PROGRAM TYPE

BMP	Batch message processing program
DBT	DBCTL CICS threads
FPU	Fast Path utility
JBP	Java batch message processing program
JMP	Java message processing program
IFP	IMS Fast Path program
MPP	Message processing program
MPC	Message processing conversational
MDP	Message-driven Fast Path program
NDP	Non-message-driven Fast Path program
ODB	DBCTL ODBA thread
TPI	CPI-C driven programs

<10> NO. EXECS

Number of times this program was scheduled during this reporting period.

<11> TRANS/EXEC

Average number of transactions processed per scheduling of this program.

<12> RESPONSE TIME

Average response time for the transactions processed by this program. The time is in seconds and is derived by finding the difference between the time the transaction arrived in the queue and the time the transaction was completed and messages were ready to send back.

Normally, this value is defined as the sum of INPUT QUEUE TIME plus ELAPSED TIME.

For DBCTL threads and TPI, only the elapsed time is reported.

If the response option is in effect, it is defined as transaction arrival time (of the original transaction in the case of message switches) to the first attempt to transmit an output message to the originating terminal (log record type 31). If no response is made for a transaction, this time is zero.

Note: If the response option is in effect, the response time is zero for DBCTL threads and TPI. If a transaction type generally has a response, but not always, the average reported here is artificially low. In the response reports (described in Chapter 9) the averages are accurate even in this case.

<13> QUEUE TIME

Average queue wait time for the transactions processed by this program. The time is in seconds and is derived by finding the difference between the time the transaction arrived in the queue and the time that the transaction was started by the message processing program.

Normally, queue time is defined from the arrival time of the originating transaction. If the response option is in effect, however, queue time is defined from the arrival time of the actual transaction. This definition differs from the normal definition only in the case of message switches.

If the response option is in effect, the response time is zero for DBCTL threads and TPI.

<14> ELAPSED TIME TOTAL HRS

Total elapsed program residency time for all program executions. The value is a sum of all the program's elapsed times for the current reporting period. The value is expressed in hours.

<15> ELAPSED TIME AVG (SECS)

Average elapsed program residency time per execution. The value is derived by dividing the ELAPSED TIME by the NO. EXECS. The value is expressed in seconds.

Table 5-1 Program (PSB) Processing Report Elements (Part 3 of 5)

<16> MSG REG CPU TIME TOTAL HRS	Cumulative amount of CPU time this program has consumed. The value is the sum of all of the message region CPU time used in transaction processing for the current reporting period. The value is expressed in hours (the least significant digit represents 360 ms). For more information, see “Application Program CPU” on page 2-7.
<17> MSG REG CPU TIME AVG (SECS)	Average amount of CPU time this program consumes per execution. The value is derived by dividing the MSG REG CPU TIME - TOTAL HOURS by the NO. EXECS. The value is expressed in seconds. For more information, see “Application Program CPU” on page 2-7.
<18> DL/I CPU TIME TOTAL HRS	Cumulative amount of DL/I CPU TIME this program has consumed. The value is the sum of all the DL/I CPU TIME used in transaction processing for this reporting period. The value is expressed in hours. For more information, see “Message DL/I CPU” on page 2-7 and “Control DL/I CPU” on page 2-8.
<19> DL/I CPU TIME AVG (SECS)	Average amount of DL/I CPU TIME this program has consumed. The value is the sum of all the DL/I CPU TIME used in transaction processing for this reporting period. The value is expressed in seconds. For more information, see “Message DL/I CPU” on page 2-7 and “Control DL/I CPU” on page 2-8.
<20> DB2 CPU TIME TOTAL HRS	Cumulative amount of DB2 CPU TIME this program has consumed. The value is the sum of all the DB2 CPU TIME used in transaction processing for this reporting period. The value is expressed in hours. For DBCTL threads, this field is zero. For more information, see “DB2 CPU” on page 2-8.
<21> DB2 CPU TIME AVG (SECS)	Average amount of DB2 CPU TIME this program has consumed. The value is the sum of all of the DB2 CPU TIME used in transaction processing for this reporting period. The value is expressed in seconds. For DBCTL threads, this field is zero. For more information, see “DB2 CPU” on page 2-8.
<22> CORE ALOC	Amount of free storage available in the dependent region after IMS initialization and program preloading (if used). For DBCTL threads, this field is zero.
<23> CORE USED	Link-edited length of the program.
<24> ABEND%	Percentage of time this program has abended, based on the number of abends divided by NO. EXECS.

Table 5-1 Program (PSB) Processing Report Elements (Part 4 of 5)

<25> POOL PSB	Highest amount of AMB pool space required in a single execution. This element shows zero if the program issues no database calls.
<26> POOL DMB	Highest amount of DMB pool space required in a single execution. This element shows zero if the program issues no database calls.
<27> SFAIL %	Percentage of transactions that resulted in a nonzero Fast Path sync point return code. The value equals the number of nonzero sync point return codes divided by the total number of transactions processed.
<28> PROG SCHED	Total amount of CPU time used by IMS to schedule this program. The value is expressed in seconds. For more information, see “Program Scheduling CPU” on page 2-10.
<29> BUF HANDLE	Total amount of CPU time used by the IMS buffer handler in processing the program during the current reporting period. The value is expressed in seconds For more information, see “Message Buffer CPU” on page 2-8 and “Control Buffer CPU” on page 2-9.
<30> OPEN/CLOSE (SECONDS)	Total amount of CPU time used by the program to process the opens and closes of required databases during the current reporting period. The value is expressed in seconds. For more information, see “Message OPEN/CLOSE CPU” and “Control OPEN/CLOSE CPU” on page 2-9.
<31> MESSAGE GET UNIQUES - TOTAL	Total number of MESSAGE GET UNIQUE calls issued by this program.
<32> MESSAGE GET UNIQUES - HIGH	Highest number of MESSAGE GET UNIQUE calls issued by this program in a single execution. If summary IRUFs are used, this value is the average of the observed values.
<33> MESSAGE GET UNIQUES - AVG	Average number of MESSAGE GET UNIQUE calls issued by this program in a single execution, computed as total MESSAGE GET UNIQUE calls divided by NO. EXECS.
<34> MESSAGE GET UNIQUES - LOW	Lowest (excluding zero values) number of MESSAGE GET UNIQUE calls issued by this program in a single execution. If summary IRUFs are used, this value is the average of the observed values.
<35> MESSAGE INSERTS TOTAL	Total number of MESSAGE INSERT calls issued by this program. For IMS, MESSAGE PURGE calls are included.
<36> MESSAGE INSERTS HIGH	Highest number of MESSAGE INSERT calls issued by this program in a single execution. For IMS, MESSAGE PURGE calls are included. If summary IRUFs are used, this value is the average of the observed values.

Table 5-1 Program (PSB) Processing Report Elements (Part 5 of 5)

<37> MESSAGE INSERTS AVG Average number of MESSAGE INSERT calls issued by this program in a single execution, computed as total MESSAGE INSERT calls divided by NO. EXECS.
<38> MESSAGE INSERTS LOW Lowest (excluding zero values) number of MESSAGE INSERT calls and PURGE calls issued by this program in a single execution. If summary IRUFs are used, this value is the average of the observed values.
<39> MESSAGE GET NEXTS TOTAL Total number of MESSAGE GET NEXT calls issued by this program.
<40> MESSAGE GET NEXTS HIGH Highest number of MESSAGE GET NEXT calls issued by this program in a single execution. If summary IRUFs are used, this value is the average of the observed values.
<41> MESSAGE GET NEXTS AVG Average number of MESSAGE GET NEXT calls issued by this program in a single execution, computed as total GET NEXT calls divided by NO. EXECS.
<42> MESSAGE GET NEXTS LOW Lowest (excluding zero values) number of MESSAGE GET NEXT calls issued by this program in a single execution. If summary IRUFs are used, this value is the average of the observed values.
<43> DL/I REQUESTS Total number of DL/I requests made in transaction processing during the reporting period. The DL/I request count is a total of all GET UNIQUE, GET NEXT, INSERT, REPLACE, and DELETE calls that have been issued.
<44> ACTUAL I/O Total number of actual I/O requests made in transaction processing during the reporting period. The actual I/O request count is a total of all key data set reads and writes, and all nonkey data set reads and writes that have been issued. For more information, see “Database Reads” on page 2-12 and “Database Writes” on page 2-13.
<45> NO I/O Count of the number of times during the reporting period that an I/O requirement was satisfied by finding the required record already contained in a buffer. For more information, see “NO I/O” on page 2-13.
<46> DB2 REQUESTS Total number of DB2 requests made in transaction processing during the reporting period. The DB2 request count is a total of all SQL calls that have been issued. For DBCTL threads, this field is zero.

Program (PSB20) Processing Report

DBCTL Threads:

DBCTL CICS and ODBA thread activity can be reported by PRSPSB20. The following considerations apply:

- CICS=YES or CICS=OFFLINE must be specified for the Event Collector in BBPARM member IMFECP00.
- Message region CPU time for DBCTL threads represents only the CPU time used to process the DL/I calls.
- The core used, message GU, GN, and ISRT are zero.

Figure 5-3 provides an example of the Program (PSB20) Processing Report.

Figure 5-3 Program (PSB20) Processing Report

```
**** IMF ****                                IMS PERFORMANCE REPORTER                                **** IMF ****
CURRENT DATE -  03/22/yy <1>                PROGRAM (PSB20) PROCESSING REPORT                       PAGE NO.    1
PROGRAM NAME <2>                      REPORT NUMBER 01 <3>          <4> REPORT WILL HAVE FIRST  (ALL) PROGRAMS LISTED
REPORTING RANGE REQUESTED yy.350 00.01 TO yy.350 23.59 <5>          <6> ACTUAL REPORTING RANGE FOUND yy.350 05.41 TO yy.350 05.43
*****************************************************************************************************************************
*              PSB    *   HI WATER MARKS.............  *      #      #    TOTAL.. AVG.........      *     AVG...................   *
*   PSBNAME    TYP    *   PSB    DMB    COREU  COREA  *    SCHED  ABEND  ELAPSED ELAPSED  SCPU      *     MGU     MGN     MISRT    *
*                     *                                *                 .HOURS. ...SECONDS...     *                                  *
*****************************************************************************************************************************
*   <7>        <8>    *    <9>   <10>   <11>   <12>   *     <13>  <14>    <15>     <16>   <17>      *     <18>    <19>    <20>     *
*   IMSSTART   MPP    *    140      0     28   4556   *        2     0    0.0151   27.20  0.000     *     1.00    0.00    1.00     *
*   P62522     MPP    *    140      0      4   4604   *      124     0    0.0051    0.15  0.000     *     1.00    0.00   33.10     *
*   P62535     MPP    *    140      0    398   4184   *        3     0    0.0002    0.34  0.000     *     1.00    0.00    1.00     *
*   P77501     MPP    *    180      0      4   4604   *       26     0    0.0022    0.31  0.000     *     1.00    0.00    0.00     *
*   P77515     MPP    *    180      0      4   4600   *        1     1    0.0000    0.14  0.000     *     1.00    0.00    0.00     *
*   P87000     MPP    *   5212   6624    106   4484   *     1457     1    0.1264    0.31  0.000     *     2.04    0.00    0.20     *
*   P87001     MPP    *   2676   3832     32   4540   *       34     0    0.0021    0.22  0.000     *     1.00    0.00    0.79     *
*   P87004     MPP    *   5244   3888    148   4424   *        4     0    0.0002    0.19  0.000     *     1.00    0.00    0.50     *
*   P87006     MPP    *   1724   1832     56   4536   *     1106     0    0.0614    0.20  0.000     *     1.00    0.00    0.03     *
*   P87007     MPP    *   3172   2552    108   4464   *       15     0    0.0005    0.12  0.000     *     1.00    0.00    1.20     *
*   P87008     MPP    *   3188   2552    210   4380   *       18     0    0.0008    0.17  0.000     *     1.72    0.00    1.11     *
*   P87009     MPP    *   3188   2552    182   4408   *       85     0    0.0029    0.12  0.000     *     1.00    0.00    1.19     *
*   P87012     MPP    *   5188   5664    178   4396   *       88     0    0.0048    0.19  0.000     *     1.00    0.00    1.33     *
*   P87013     MPP    *   5812   6456    176   4416   *      294     0    0.0097    0.11  0.000     *     1.00    0.00    0.00     *
*   P87016     MPP    *   3132   2552    106   4484   *       59     0    0.0024    0.14  0.000     *     1.00    0.00    1.20     *
*   P87017     MPP    *   2572   1320    122   4448   *       16     0    0.0005    0.11  0.000     *     2.00    0.00    1.00     *
*   P87018     MPP    *   3132   2552    100   4492   *       12     0    0.0005    0.17  0.000     *     1.00    0.00    1.25     *
*   P87019     MPP    *   3132   2552    114   4476   *       87     0    0.0035    0.14  0.000     *     1.00    0.00    1.14     *
*   P87020     MPP    *   3132   2552    114   4460   *        7     0    0.0003    0.16  0.000     *     1.00    0.00    1.00     *
*   P87022     MPP    *   3524   3888     40   4532   *       12     0    0.0003    0.09  0.000     *     1.00    0.00    0.50     *
*   P87024     MPP    *   5156   4584    154   4436   *       88     0    0.0044    0.18  0.000     *     1.00    0.00    1.01     *
*****************************************************************************************************************************
```

Table 5-2 describes Program (PSB20) Processing Report elements. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 5-2 Program (PSB20) Processing Report Elements (Part 1 of 2)

<1> CURRENT DATE Date this report was generated, in mm/dd/yy format.
<2> subtitle Report subtitle, which can be user-specified (see “Report Control Statements” on page 5-18) or a default subtitle (40 characters maximum). The default subtitle is determined by the control statement report code. One report is created for each control statement. Multiple reports are printed in descending sequence by report code. If report code 01 is selected, however, it is always printed first. Report code 01 produces an alphabetical listing.
<3> REPORT NUMBER *xx* The variable *xx* is the report code specified in the report control statement.
<4> REPORT WILL HAVE FIRST *nn* PROGRAMS LISTED Defines the print limit request specified for this report.
<5> REPORTING RANGE REQUESTED Time range requested for this program usage analysis. This range is the same as the range specified in the parameter input data. If the time range selection was not specified, this range is set to equal the ACTUAL REPORTING RANGE FOUND. The range is expressed as the lowest date (yy.ddd) and time (hh.mm) requested through the highest date (yy.ddd) and time (hh.mm) requested.
<6> ACTUAL REPORTING RANGE FOUND Time range encountered for this program usage analysis. This range is expressed as the lowest date (yy.ddd) and time (hh.mm) found in the data selected for reporting through the highest date (yy.ddd) and time (hh.mm) found in the data selected.
<7> PSBNAME Name of the program being reported.
<8> PSB TYP Program type, including: BMP Batch message processing program DBT DBCTL CICS threads FPU Fast Path utility JBP Java batch message processing program JMP Java message processing program IFP IMS Fast Path program MPP Message processing program MPC Message processing conversational MDP Message-driven Fast Path program NDP Non-message-driven Fast Path program ODB DBCTL ODBA thread TPI CPI-C driven programs

Table 5-2 Program (PSB20) Processing Report Elements (Part 2 of 2)

<9>	**HI WATER MARKS PSB** Greatest amount of PSB pool space required in a single execution.
<10>	**HI WATER MARKS DMB** Greatest amount of DMB pool space required in a single execution.
<11>	**HI WATER MARKS COREU** Greatest amount of storage that the program has used. CORE USED is the link-edited length of the program. For DBCTL threads, this field is zero.
<12>	**HI WATER MARKS COREA** Largest contiguous area of storage in the dependent region available for the message processing program. CORE ALOC is the amount of free storage available after IMS initialization and program preloading (if used).
<13>	**# SCHED** Number of times this program was scheduled during this reporting period.
<14>	**# ABEND** Number of times this program has abended.
<15>	**TOTAL ELAPSED HOURS** Total elapsed program residency time for program executions. The value is a sum of all the program's elapsed times for the current reporting period. The value is expressed in hours.
<16>	**AVG ELAPSED SECONDS** Average elapsed program residency time per execution. The value is derived by dividing the TOTAL ELAPSED HOURS by the NO. EXECS. The value is expressed in seconds.
<17>	**AVG SCPU SECONDS** Average amount of CPU time used by the program in processing during this reporting period for scheduling transactions. The value is expressed in seconds per execution. For more information, see "Program Scheduling CPU" on page 2-10.
<18>	**AVG MGU** Average number of MESSAGE GET UNIQUE calls issued by this program in a single execution.
<19>	**AVG MGN** Average number of MESSAGE GET NEXT calls issued by this program in a single execution.
<20>	**AVG MISRT** Average number of MESSAGE INSERT calls issued by this program in a single execution. PURGE calls are also included.

Job Control Statements

This section describes the JCL statements required to execute the PRSPSBRP and PRSPSB20 programs. Except for the TEMPFILE DD statement, all the statements are the same for both programs. Figure 5-4 on page 5-15 provides a JCL example.

Table 5-3 PRSPSBRP and PRSPSB20 JCL Statements

Statement	Function
JOB	Initiates the job.
EXEC	Specifies the program name of the program usage analysis process as PGM={PRSPSBRP|PRSPSB20} Also specifies the region and the PARM parameters required to define a time period, system ID, an internal sort size, and response times (see "PARM Options in the EXEC Statement" on page 5-16). The region requirement can be affected by • block size of the IRUF • number of buffers specified for the data sets • internal sort size requirements
STEPLIB DD	Defines the program library (IMF.LOAD) that contains the PRSPSBRP and PRSPSB20 program load modules.
RESUTIL DD	Defines the IRUF used as the input to the analysis. The data set DCB attributes are RECFM=VBS,LRECL=30970,BLKSIZE=30974.
PSBLIST DD	Defines the print data set to contain the program selection trace report and control statement diagnostic messages. The characteristics of the data set are RECFM=FB,LRECL=133. BLKSIZE must be specified explicitly.
PSBLIST2 DD	Defines the print data set to contain the program usage reports. The characteristics of the data set are RECFM=FB,LRECL=133. BLKSIZE must be specified explicitly.
TEMPFILE DD	Defines a temporary file used during the statistics gathering and sorting. The characteristics of the data set are PRSPSBRP RECFM=FB,LRECL=296,BLKSIZE=6216 PRSPSB20 RECFM=FB,LRECL=116,BLKSIZE=5800
PSBSELEC DD	Defines report control statements, which are described on page 5-18. If the DSN parameter is used to define the data set, the data set characteristics are RECFM=FB,LRECL=80. BLKSIZE must be specified explicitly.
SORTLIB DD	Defines the library for the modules loaded by an internally invoked sort program.
SYSOUT DD	Defines the output class.
SORTWK*nn* DD	Defines work data sets for data sorting; *nn* is a numeric.

Figure 5-4 provides a JCL example for PRSPSBRP.

Figure 5-4 Sample JCL for PRSPSBRP

```
//JOBNAME  JOB  ..............
//STEP1    EXEC PGM=PRSPSBRP,REGION=192K,
//              PARM='95010,0800,95010,1600,*,350000'
//STEPLIB  DD   DSN=IMF.LOAD,DISP=SHR
//RESUTIL  DD   DSN=IRUF.MONTHS,DISP=SHR,
//              DCB=(RECFM=VBS,LRECL=30970,BLKSIZE=30974)
//PSBLIST  DD   SYSOUT=A,DCB=BLKSIZE=133
//PSBLIST2 DD   SYSOUT=A,DCB=BLKSIZE=133
//TEMPFILE DD   UNIT=SYSDA,SPACE=(CYL,(20,4)),
//              DCB=(RECFM=FB,LRECL=296,BLKSIZE=6216)
//PSBSELEC DD   *
PSB 04 00030
PSB 08 00040
PSB 25 00030 POTENTIAL HIGH ACTIVE SCRATCH PAD USERS
PSB 14 00010
/*
//SORTLIB  DD   DSN=SYS1.SORTLIB,DISP=SHR
//SYSOUT   DD   SYSOUT=A
//SORTWK01 DD   UNIT=SYSDA,SPACE=(CYL,(20))
//SORTWK02 DD   UNIT=SYSDA,SPACE=(CYL,(20))
//SORTWK03 DD   UNIT=SYSDA,SPACE=(CYL,(20))
//
```

Note: The TEMPFILE DCB for PRSPSB20 must be `DCB=(RECFM=FB,LRECL=116,BLKSIZE=5800)`

PARM Options in the EXEC Statement

The PRSPSBRP and PRSPSB20 EXEC statement PARM options can be used to define

- time period selection
- system ID selection
- sort size for the internal sort
- response option (PRSPSBRP program only)

Time Period Selection

This option defines the range of time to be selected for this reporting process. The range is specified as the lowest Julian date (yyddd) and time (hhmm) to the highest Julian date (yyddd) and time (hhmm).

PARM Positions	Options
01 – 21	ldate,ltme,hdate,htme ldate Low Julian date in yyddd format. ltme Low hour/minute in hhmm format. hdate High Julian date in yyddd format. htme High hour/minute in hhmm format.

The value 00000,0000,00000,0000 specifies that the time period selection is not to be invoked.

System ID Selection

This PARM option defines the computing system to be reported.

PARM Positions	Options
22 – 23	,x | ,* x System ID to be selected. * System ID selection is not to be invoked.

Sort Size for the Internal Sort

This option is a six-digit number that specifies the amount of storage for the internal sorting process (from 018000 bytes up to the maximum available main storage).

PARM Positions	Options
24 – 30	,nnnnnn | ,030000 nnnnnn Sort storage size. 030000 Sort storage size default of 30,000 bytes of storage.

Response Option

This option specifies whether to report alternate input queue and response times (R RESPONSE field of the transaction accounting record described in the *MAINVIEW for IMS Offline – Customization and Utilities Guide*). If the input IRUF was not created with the response option in effect, the response option for the report cannot be specified.

PARM Positions	Options
31 – 32	,R R Specifies the use of the alternate times. If this parameter is not specified, the normal input queue response times are calculated (INPUT QUEUE TIME + ELAPSED TIME).

PARM Options Example

The following example requests a program usage analysis on day 02.076 from 8:00 A.M. to 4:00 P.M. All system IDs (*) are to be selected. The storage size for the internal sort is 50,000 bytes. The alternate input queue and response times are used (R) if the reporting is being done by PRSPSBRP.

```
PARM='02076,0800,02076,1600,*,050000,R'
```

Report Control Statements

Program processing is selected by the use of positional report control statements. The statement position defines the type of report, selects the program analysis to be performed, limits the number of programs that are reported, and subtitles the report as specified by the user or by default.

Table 5-4 shows report control statement syntax for PRSPSBRP and PRSPSB20.

Table 5-4 Report Statement Syntax – Program Processing

Position	Input
01 – 03	Statement ID: PSB
04	Blank
05 – 06	Code for report to be produced. Valid codes are 01 through 32 for PRSPSBRP execution and 01 through 13 for PRSPSB20 execution. Except for report code 01, the report presentation sequence is descending. For example, 23 in this position of a PRSPSBRP control statement requests a report of the programs with the highest number of MESSAGE GET UNIQUE calls. If a code is not selected, the analysis is reported alphabetically by program name (code 01 is the default). If report code 01 is selected and there is more than one control statement, the report for 01 is printed first followed by the other reports in descending sequence by report code.
07	Blank
08 – 12	A number in this position limits the number of programs reported. If positions 8 through 12 of the control statement contain 00000, all programs are listed in the report. For example, 00030 limits the report to 30 programs.
13	Blank
14 – 53	User-specified title. If one is not specified, a default title that is associated with the report code is used.

One report is generated for each defined report control statement, usually in descending sequence by report code. If report code 01 is selected, however, it is printed first. The order of presentation within a report is determined by the specified report code.

For example, the control statements for PRSPSBRP processing, shown in Figure 5-4 on page 5-15, produce the following program usage reports:

1. The first control statement requests a report of the 30 programs (00030 in statement position 8 – 12) that have the highest average response time by transaction (report code 04 in statement positions 5 and 6).

2. The second control statement requests a report of the 40 programs (00040) that have resided the longest time within a message region (report code 08).

3. The third control statement requests a report of the 30 programs (00030) issuing the greatest number of MESSAGE GET NEXT calls (report code 25). The subtitle of the report is defined as POTENTIAL HIGH ACTIVE SCRATCH PAD USERS. The default subtitle for REPORT 25 is TOTAL NUMBER OF MESSAGE GET NEXTS.

4. The fourth control statement requests a report of the 10 programs (00010) with the greatest percentage of abends in relation to the number of times the program was executed (report code 14).

In the example above, report 25 is printed first, followed by reports 14, 08, and 04.

As noted previously, PRSPSBRP and PRSPSB20 each process a unique set of report codes. The report codes are described in the next two sections.

PRSPSBRP Control Statement Report Codes

The valid report codes for positions 5 and 6 of a PRSPSBRP control statement are listed below.

Code	Description
01	Alphabetic listing by program name
02	Number of program executions
03	Average transactions processed per execution
04	Average transaction response time
05	Average transaction queue wait time
06	Total elapsed time
07	Average elapsed time
08	Total message region CPU time
09	Average message region CPU time
10	Total DL/I CPU time
11	Average DL/I CPU time
12	Region allocated
13	Region used
14	Percentage of total executions that abended
15	PSB pool size requirement
16	DMB pool size requirement
17	Percentage of total transactions that failed sync point processing
18	Program scheduling CPU time
19	Buffer handling CPU time
20	Open/close CPU time
21	Total of MESSAGE INSERT calls
22	Average number of MESSAGE INSERT calls
23	Total of MESSAGE GET UNIQUE calls
24	Average number of MESSAGE GET UNIQUE calls
25	Total of MESSAGE GET NEXT calls
26	Average number of MESSAGE GET NEXT calls
27	Total DL/I requests
28	Total actual I/Os issued
29	Total NO I/Os encountered
30	Total DB2 CPU time
31	Average DB2 CPU time
32	Total DB2 requests

PRSPSB20 Control Statement Report Codes

The valid report codes for positions 5 and 6 of a PRSPSB20 control statement are listed below.

Code	Description
01	Alphabetic listing by program name
02	PSB pool size requirement
03	DMB pool size requirement
04	Region used
05	Region allocated
06	Number of program executions
07	Number of total executions that abended
08	Total elapsed time
09	Average elapsed time
10	Program schedule CPU time
11	Average number of MESSAGE GET UNIQUE calls
12	Average number of MESSAGE GET NEXT calls
13	Average number of MESSAGE INSERT calls
14	Reserved

Return Codes

This section describes the return codes that indicate the results of PRSPSBRP or PRSPSB20 execution.

Code	Explanation
028	Invalid delimiter was found in the time period selection. A required comma is missing or was specified incorrectly.
032	Day is out of range (001-366) for the selection low date.
036	Time of day is out of range (0000-2359) for the selection low time.
040	Day is out of range (001-366) for the selection high date.
044	Time of day is out of range (0000-2359) for the selection high time.
048	High date/time selection (yyddd,hhmm) is less than the low date/time (yyddd,hhmm).
052	Invalid system ID delimiter was found. A required comma is missing or was specified incorrectly.
056	System identifier contains a blank or invalid identifier.
060	Invalid sort size delimiter was found. A required comma is missing or was specified incorrectly.
064	Sort size was specified incorrectly. The value given was either not six digits long, not numeric, or less than 18000.
068	**PSBRP only.** Response option code was specified incorrectly.
072	**PSBRP only.** Response option was requested but transaction accounting records were found in the IRUF that were not created with this option. (R OPTION does not indicate R in the transaction accounting record, which you can verify with the PRSPRINT utility. See the *MAINVIEW for IMS Offline – Customization and Utilities Guide*.)
076	**PSBRP only.** For certain PSBs, the transaction accounting record exists, but the program accounting record was not found in the input IRUF. This situation may occur when you are running with an IRUF consisting only of selected records.
128	Error was detected in the program selection statement analysis. An error in statement format or content was encountered.
132	First internal sort (alpha sort) returned with an unsuccessful status. Check the sort size for the internal sort, which is defined in positions 24 through 30 of the EXEC statement PARM parameter (see “PARM Options in the EXEC Statement” on page 5-16).
136	Reports were requested but no program statistics were found within the requested range.
140	Second internal sort (report sequencing) returned with an unsuccessful status.

Chapter 6 Transaction Processing Reports (PRSTRN10, PRSTRNFP, PRSTRND2)

The activity reports for transactions are used to evaluate and control transaction response time and resource usage critical to IMS overhead costs.

Objectives:

- Quantify the overhead incurred in the processing of the transaction.
- Quantify transaction message activity.
- Quantify transaction processing by transaction response times, queue wait times, and number of transactions processed per execution.

Uses:

- Set more effective processing limits.
- Identify transactions resulting in degraded response times due to queue waits, excessive overhead timings, excessive numbers of DL/I or DB2 requests, or high I/O requirements per request.
- Identify transactions that are processed most frequently and that consume the most IMS system resources.

Input and Output

Transaction processing reports are created by batch execution of the PRSTRN10, PRSTRNFP, or PRSTRND2 report programs against a detail or summarized IRUF.

- **PRSTRN10** creates the Transaction (TRN10) Processing Report.

  PRSTRN10 analyzes DL/I transactions. For each transaction, it reports the average response and queue-wait times; the CPU time consumed by the buffer handler, application programs, and DL/I and DB2 requests; the type and average number of DL/I requests; and the type and average number of DL/I I/Os.

- **PRSTRNFP** creates the Fast Path Transaction (TRNFP) Processing Report.

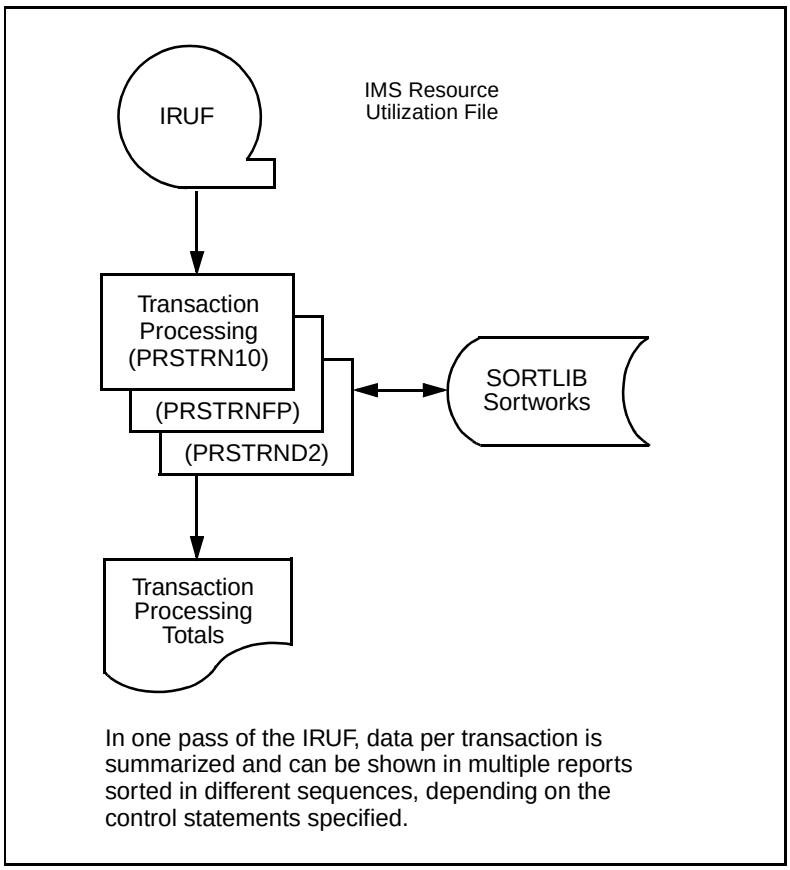
  PRSTRNFP analyzes all transactions, reporting Fast-Path-specific information. For each transaction, it reports the average response time; the number of buffer waits and buffers used and DEDB CI contentions; and Fast Path and non-Fast Path calls, including DB2 calls.

- **PRSTRND2** creates the DB2 Transaction (TRND2) Processing Report.

  PRSTRND2 analyzes all transactions. For each transaction, it reports the average response, elapsed, and queue-wait times; CPU time consumed by application programs, DL/I, and DB2 requests; average number of DL/I calls; and the type and average number of SQL calls to DB2.

Figure 6-1 on page 6-3 shows the system flow for PRSTRN10, PRSTRNFP, and PRSTRND2.

Figure 6-1 PRSTRN10, PRSTRNFP, and PRSTRND2 System Flow



Report Element Descriptions

The presentation of the report elements depends on the report code selected (see “Report Control Statements” on page 6-19). Quantities are sorted in descending order. For example, if maximum CI contentions is selected, (see code 10 in “PRSTRNFP Control Statement Report Codes” on page 6-22), the transaction with the highest number of CI contentions appears first. The control statement can be used to report, for example, the ten transactions that averaged the highest number of CI contentions.

Transaction (TRN10) Processing Report

DBCTL Threads:

DBCTL CICS and ODBA thread activity can be reported by PRSTRN10. The following considerations apply:

- CICS=YES or CICS=OFFLINE must be specified for the Event Collector in BBPARM member IMFECP00.
- Message region CPU time for DBCTL threads represents only the CPU time used to process the DL/I calls.
- Queue time, message GN, and message ISRT are zero.
- Response time is zero if the response option is specified in the execution parameters (see “PARM Options in the EXEC Statement” on page 6-17). Response time is the transaction elapsed time, if the response option is not chosen.

Figure 6-2 provides an example of the Transaction (TRN10) Processing Report.

Figure 6-2 Transaction (TRN10) Processing Report

```
**** IMF ****                                    IMS PERFORMANCE REPORTER                                          **** IMF ****
CURRENT DATE -  03/22/yy <1>                TRANSACTION(TRN10) PROCESSING REPORT     (WITH RESPONSE OPTION)        PAGE NO.    1
TRANSACTION CODE <2>                    REPORT NUMBER 01 <3>          <4> REPORT WILL HAVE FIRST     10 TRANSACTIONS LISTED
REPORTING RANGE REQUESTED yy.350 00.01 TO yy.350 23.59 <5>            <6> ACTUAL REPORTING RANGE FOUND yy.350 05.41 TO yy.350 05.43
*************************************************************************************************************************************
*                       #       AVG/TRAN.... *   AVG/TRAN.........  *  AVG/TRAN.......................... * AVG/TRAN.............. *
* TRANCODE CLS/RTCDE  TRANS     RESP   QUEUE *   BCPU  MCPU   DCPU  *  MGN MISR  GU   GN   DEL  REP  INS * KEY   NOKEY NOKEY   NO  *
*                               SECS.............................. *                                        * READS READS WRITS   IO  *
*************************************************************************************************************************************
* <7>      <8>          <9>      <10>   <11> *   <12>   <13>   <14> *  <15> <16> <17> <18> <19> <20> <21>*  <22>  <23>  <24>  <25> *
* KNV5A3BS 001            1       .60    .10 *    .00    .01    .00 *   .0  1.0  1.0   .0   .0   .0   .0 *    .0    .0    .0   3.0 *
*                                            *                      *                                    *                          *
* KNV9Z3BS 001            4       .28    .05 *    .00    .01    .00 *   .0  1.0   .5   .0   .0   .0   .0 *    .0    .5    .0   1.0 *
*                                            *                      *                                    *                          *
* KUM5A380 001            2       .15    .17 *    .00    .02    .00 *   .0  1.0  1.5   .0   .0   .0   .0 *    .0    .0    .0   3.0 *
*                                            *                      *                                    *                          *
* KUM9Z380 001            4       .13    .10 *    .00    .02    .00 *   .0  1.0  1.5   .0   .0   .0   .0 *    .0    .5    .0   2.5 *
*                                            *                      *                                    *                          *
* KUM9Z381 001            1       .10    .03 *    .00    .01    .00 *   .0  1.0   .0   .0   .0   .0   .0 *    .0    .0    .0    .0 *
*                                            *                      *                                    *                          *
*************************************************************************************************************************************
```

Table 6-1 describes Transaction (TRN10) Processing Report elements. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 6-1 Transaction (TRN10) Processing Report Elements (Part 1 of 3)

<1> CURRENT DATE Date this report was generated, in mm/dd/yy format. **Note:** If the response option is in effect, WITH RESPONSE OPTION will show after the report title.
<2> subtitle Report subtitle, which can be user-specified (see “Report Control Statements” on page 6-19) or a default subtitle (40 characters maximum). The default subtitle is determined by the control statement report code. One report is created for each control statement. Multiple reports are printed in descending sequence by report code. If report code 01 is selected, however, it is always printed first. Report code 01 produces an alphabetic listing.
<3> REPORT NUMBER *xx* The variable *xx* is the report code specified in the report control statement.
<4> REPORT WILL HAVE FIRST *nnnn* TRANSACTIONS LISTED Defines the print limit request specified for this report.
<5> REPORTING RANGE REQUESTED Time range requested for this transaction usage analysis. This range is the same as the range specified in the parameter input data. If the time range selection was not specified, this range is set to equal the ACTUAL REPORTING RANGE FOUND. The range is expressed as the lowest date (yy.ddd) and time (hh.mm) requested through the highest date (yy.ddd) and time (hh.mm) requested.
<6> ACTUAL REPORTING RANGE FOUND Time range encountered for this transaction usage analysis. This range is expressed as the lowest date (yy.ddd) and time (hh.mm) found in the data selected for reporting through the highest date (yy.ddd) and time (hh.mm) found in the data selected.
<7> TRANCODE Name of the transaction being reported.
<8> CLS/RTCDE Identification for the class used to assign the transaction to a specific message region. For Fast Path message–driven transactions, the routing code is used in place of the class.
<9> # TRANS Number of times this transaction was executed during the analysis period.

Table 6-1 Transaction (TRN10) Processing Report Elements (Part 2 of 3)

<10> AVG/TRN RESP	Average transaction response time. The time is in seconds, and it represents the difference between the time the transaction arrived in the queue and the time the transaction was completed and messages were ready to be sent back. Normally, this value is defined as the sum of INPUT QUEUE TIME and ELAPSED TIME. For DBCTL threads and TPI, only the elapsed time is reported. If the response option is in effect, the response time is defined as transaction arrival time (of the original transaction in the case of message switches) to the first attempt to transmit an output message to the originating terminal (log record type X'31'). If no response was made for a transaction, this time is zero. **Note:** If the response option is in effect, the response time is zero for DBCTL threads and TPI. If there is an occasional response to a transaction type, the average reported here is artificially low. In the response reports (described in Chapter 9), the averages are accurate even in this case.
<11> AVG/TRN QUEUE	Average queue wait time for the transaction. The time is in seconds and represents the difference between the time the transaction arrived in the queue and the time that the transaction was started by the message processing program. Normally, this value is defined from the arrival time of the originating transaction. If the response option is in effect, the value is defined from the arrival time of the actual transaction. This value differs from the normal definition only in the case of message switches.
<12> AVG/TRN BCPU	Average amount of CPU time used by the IMS buffer handler for this transaction in processing during this reporting period. The value is expressed in seconds. (This value may always be zero if the measurement was not selected at system installation.) For more information, see “Message Buffer CPU” on page 2-8 and “Control Buffer CPU” on page 2-9.
<13> AVG/TRN MCPU	Average amount of control region CPU time and DB2 CPU time (expressed in seconds) that this transaction consumes per execution. A plus sign in this field indicates DB2 CPU time is included. For more information, see “Application Program CPU” on page 2-7 and “DB2 CPU” on page 2-8.
<14> AVG/TRN DCPU	Average amount of message DL/I CPU time and control region DL/I CPU time (expressed in seconds) that this transaction consumes per execution. For more information, see “Message DL/I CPU” on page 2-7 and “Control DL/I CPU” on page 2-8.
<15> AVG/TRN MGN	Average number of MESSAGE GET NEXT calls issued by this transaction.
<16> AVG/TRN MISR	Average number of MESSAGE INSERT and PURGE calls issued by the transaction.
<17> AVG/TRN GU	Average number of times a GET UNIQUE call was requested in processing the transaction.
<18> AVG/TRN GN	Average number of times a GET NEXT call was requested in processing the transaction.

Table 6-1 Transaction (TRN10) Processing Report Elements (Part 3 of 3)

<19>	**AVG/TRN DEL** Average number of times a DELETE was requested in processing the transaction.
<20>	**AVG/TRN REP** Average number of times a REPLACE was requested in processing the transaction.
<21>	**AVG/TRN INS** Average number of times an INSERT was requested in processing the transaction.
<22>	**AVG/TRN KEY READS** Average number of reads issued to the key data set to satisfy the DL/I requests for the transaction. For more information, see “Database Reads” on page 2-12.
<23>	**AVG/TRN NOKEY READS** Average number of reads issued to the nonkey data set to satisfy DL/I requests for the transaction. For more information, see “Database Reads” on page 2-12.
<24>	**AVG/TRN NOKEY WRITS** Average number of writes issued to the nonkey data set to satisfy DL/I requests for the transaction. For more information, see “Database Writes” on page 2-13.
<25>	**AVG/TRN NO IO** Average number of times DL/I requests issued by this transaction did not require I/O because requested data was still contained in the I/O buffer. For more information, see “NO I/O” on page 2-13.

Transaction (TRNFP) Processing Report

DBCTL Threads:

DBCTL CICS and ODBA thread activity can be reported by PRSTRNFP. The following considerations apply:

- CICS=YES or CICS=OFFLINE must be specified for the Event Collector in BBPARM member IMFECP00.
- Message region CPU time for DBCTL threads represents only the CPU time used to process the DL/I calls.
- MSG and MSDB CALLS are zero.
- The response time is zero if the response option is specified on the execution parameters (see “PARM Options in the EXEC Statement” on page 6-17). The response time is the transaction elapsed time if the response option is not chosen.

Figure 6-3 provides an example of the Transaction (TRNFP) Processing Report.

Figure 6-3 Transaction (TRNFP) Processing Report

```
**** IMF ****                                    IMS PERFORMANCE REPORTER                                                    **** IMF ****
CURRENT DATE -  03/22/yy <1>                TRANSACTION(TRNFP) PROCESSING REPORT     (WITH RESPONSE OPTION)         PAGE NO.    1
TRANSACTION CODE <2>                    REPORT NUMBER 01 <3>          <4> REPORT WILL HAVE FIRST     10 TRANSACTIONS LISTED
REPORTING RANGE REQUESTED yy.350 00.01 TO yy.350 23.59 <5>            <6> ACTUAL REPORTING RANGE FOUND yy.350 05.41 TO yy.350 05.43
*****************************************************************************************************************************
*                       #      AVG  *   FP BFRS    FP BFR     #     # FP CI    #    *    # MSG     # DEDB     # MSDB     # NONFP   *
* TRANCODE ROUTCODE   TRANS   RESP  *    USED       WAITS    OBL     CONT.    SYNC  *    CALLS      CALLS      CALLS      CALLS    *
*                             SECS  *  AVG  MAX   MAX  TOT   WTS   MAX  TOT   FAIL  *  AVG  MAX   AVG  MAX   AVG  MAX   AVG  MAX   *
*****************************************************************************************************************************
* <7>      <8>          <9>   <10>  * <11> <12>  <13> <14>  <15>  <16> <17>   <18>  * <19> <20>  <21> <22>  <23> <24>  <25> <26>   *
* ASO000   MPC          169  20.53  *   .0    0     0    0     0     0    0     0  *  4.9    8    .0    0    .0    0   9.2   52   *
*                                   *                                              *                                             *
* ASO200   MPC          212  14.34  *   .0    0     0    0     0     0    0     0  *  5.9    8    .0    0    .0    0  13.3  127   *
*                                   *                                              *                                             *
* ASO400   MPC           98  13.02  *   .0    0     0    0     0     0    0     0  *  5.1    9    .0    0    .0    0  14.3   82   *
*                                   *                                              *                                             *
* ASO500   MPC          130  15.44  *   .0    0     0    0     0     0    0     0  *  5.7    8    .0    0    .0    0   7.5   37   *
*                                   *                                              *                                             *
* ASO600   MPC           11  30.08  *   .0    0     0    0     0     0    0     0  *  5.0    7    .0    0    .0    0   5.8   16   *
*                                   *                                              *                                             *
* BCA000   MPC         1880  15.72  *   .0    0     0    0     0     0    0     0  *  4.7    8    .0    0    .0    0  19.2  108   *
*                                   *                                              *                                             *
* BCA200   MPC          940   9.21  *   .0    0     0    0     0     0    0     0  *  4.7    7    .0    0    .0    0  14.4   79   *
*                                   *                                              *                                             *
* BCA400   MPC          322  10.10  *   .0    0     0    0     0     0    0     0  *  5.5    8    .0    0    .0    0  19.8   70   *
*                                   *                                              *                                             *
* BCA500   MPC         1503  13.10  *   .0    0     0    0     0     0    0     0  *  5.8    9    .0    0    .0    0   9.5   46   *
*                                   *                                              *                                             *
* BCA600   MPC          289   9.03  *   .0    0     0    0     0     0    0     0  *  5.1   16    .0    0    .0    0   7.6   54   *
*                                   *                                              *                                             *
*****************************************************************************************************************************
```

Table 6-2 describes Transaction (TRNFP) Processing Report. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 6-2 Transaction (TRNFP) Processing Report Elements (Part 1 of 3)

<1> CURRENT DATE

Date this report was generated, in mm/dd/yy format.

Note: If the response option is in effect, WITH RESPONSE OPTION will show after the report title.

<2> subtitle

Report subtitle, which can be user-specified (see “Report Control Statements” on page 6-19) or a default subtitle (40 characters maximum).

The default subtitle is determined by the control statement report code. One report is created for each control statement.

Multiple reports are printed in descending sequence by report code. If report code 01 is selected, however, it is always printed first. Report code 01 produces an alphabetic listing.

<3> REPORT NUMBER *xx*

The variable *xx* is the report code specified in the report control statement.

<4> REPORT WILL HAVE FIRST *nnnn* TRANSACTIONS LISTED

Defines the print limit request specified for this report.

<5> REPORTING RANGE REQUESTED

Time range requested for this transaction usage analysis. This range is the same as the range specified in the parameter input data. If the time range selection was not specified, this range is set to equal the ACTUAL REPORTING RANGE FOUND.

The range is expressed as the lowest date (yy.ddd) and time (hh.mm) requested through the highest date (yy.ddd) and time (hh.mm) requested.

<6> ACTUAL REPORTING RANGE FOUND

Time range encountered for this transaction usage analysis. This range is expressed as the lowest date (yy.ddd) and time (hh.mm) found in the data selected for reporting through the highest date (yy.ddd) and time (hh.mm) found in the data selected.

<7> TRANCODE

Name of the transaction being reported.

<8> ROUTCODE

Identification for the Fast Path routing code used to assign the transaction to a specific message-driven region.

Mixed-mode and full function transactions contain the program type in this position. Program types are

BMP	Batch message processing program
DBT	DBCTL CICS threads
FPU	Fast Path utility
JBP	Java batch message processing program
JMP	Java message processing program
MPP	Message processing program
MPC	Message processing conversational
NDP	Non-message-driven Fast Path program
ODB	DBCTL ODBA thread
TPI	CPI-C driven programs

Table 6-2 Transaction (TRNFP) Processing Report Elements (Part 2 of 3)

<9> # TRANS Number of times this transaction was executed during the analysis period.
<10> AVG RESP SECS Average transaction response time. The time is in seconds and is derived by finding the difference between the time the transaction arrived in the queue and the time the transaction was completed and messages were ready to send back. Normally, this value is defined as the sum of INPUT QUEUE TIME and ELAPSED TIME. For DBCTL threads and TPI, only elapsed time is reported. If the response option is in effect, it is defined as transaction arrival time (of the original transaction in the case of message switches) to the first attempt to transmit an output message to the originating terminal. If no response was made for a transaction, this time is zero. **Notes:** If the response option is in effect, the response time is zero for DBCTL threads and TPI. If a transaction type generally has a response but not always, the average reported here will be artificially low. In the response reports (described in Chapter 9), the averages are accurate even in this case.
<11> AVG FP BFRS USED Average number of Fast Path buffers used per transaction.
<12> MAX FP BFRS USED Largest number of Fast Path buffers used by one occurrence of this transaction. If summarized IRUFs are used, this value is the maximum of averaged buffers used for all summarized IRUFs.
<13> MAX FP BFR WAITS Largest number of waits for Fast Path buffers that occurred for one transaction.
<14> TOT FP BFR WAITS Total number of waits for Fast Path buffers that occurred for all transactions of this type.
<15> # OBL WTS Total number of transactions that had to wait for the overflow buffer latch. This latch is needed whenever a transaction exceeds its NBA allocation and starts to use its OBA allocation.
<16> MAX # FP CI CONT. Largest number of Fast Path DEDB CI contentions that occurred for one transaction.
<17> TOT # FP CI CONT. Total number of Fast Path DEDB CI contentions that occurred for all transactions of this type.
<18> # SYNC FAIL Total number of transactions that ended with a nonzero sync point return code.
<19> AVG # MSG CALLS Average number of TP PCB DL/I calls issued per transaction. Including DBCTL threads tends to lower this average, because DBCTL threads do not make message calls.
<20> MAX # MSG CALLS Largest number of TP PCB DL/I calls issued by one transaction.

Table 6-2 Transaction (TRNFP) Processing Report Elements (Part 3 of 3)

<21> AVG # DEDB CALLS Average number of DEDB DL/I calls issued per transaction.
<22> MAX # DEDB CALLS Largest number of DEDB DL/I calls issued by one transaction.
<23> AVG # MSDB CALLS Average number of MSDB DL/I calls issued per transaction.
<24> MAX # MSDB CALLS Largest number of MSDB DL/I calls issued by one transaction.
<25> AVG # NONFP CALLS Average number of non–Fast Path DL/I database and DB2 subsystem calls issued per transaction.
<26> MAX # NONFP CALLS Largest number of non–Fast Path DL/I database and DB2 subsystem calls issued by one transaction. A plus sign in this field indicates that DB2 calls are included.

Transaction (TRND2) Processing Report

PRSTRND2 analyzes and reports all IMS-processed transactions collected in the IRUF, as shown in Figure 6-4 on page 6-12. You can use the PRSSELEC utility, described in the *MAINVIEW for IMS Offline – Customization and Utilities Guide*, to create an IRUF extract file of user-selected DB2 records. PRSTRND2 processing of the extract file produces a TRND2 report for analysis of DB2 transactions.

DBCTL Threads:

DBCTL CICS and ODBA thread activity can be reported by PRSTRND2. The following considerations apply:

- Only BMPs and JBPs can access DB2 through DBCTL.
- CICS=YES or CICS=OFFLINE must be specified for the Event Collector in BBPARM member IMFECP00.
- Message region CPU time for DBCTL threads represents only the CPU time used to process the DL/I calls.
- Response time is zero if the response option is specified in the execution parameters (shown on page 6-17). Response time is the transaction elapsed time if the response option is not chosen.
- DBCTL thread transactions are in class 0.
- Queue time, MSG calls, and DB2 calls are zero.

Figure 6-4 provides an example of the Transaction (TRND2) Processing Report.

Figure 6-4 Transaction (TRND2) Processing Report

```
**** IMF ****                                    IMS PERFORMANCE REPORTER                                          **** IMF ****
CURRENT DATE -  03/22/yy <1>                 DB2 TRANSACTION (TRND2) PROCESSING REPORT   (WITH RESPONSE OPTION)      PAGE NO.    1
TRANSACTION CODE <2>                    REPORT NUMBER 01 <3>          <4> REPORT WILL HAVE FIRST     10 TRANSACTIONS LISTED
REPORTING RANGE REQUESTED yy.350 00.01 TO yy.350 23.59 <5>            <6> ACTUAL REPORTING RANGE FOUND yy.350 05.41 TO yy.350 05.43
*************************************************************************************************************************************
*                        #       AVG/TRAN............*   AVG/TRAN...........* AVG DL/I /TRAN* AVG SQL/TRAN.......................*
* TRANCODE CLS/RTCDE  TRANS      RESP   ELAP  QUEUE *   APPL    DL/I    DB2 *    MSG   DB   * SEL/   OPEN INSERT   UPD  DLET OTHER  *
*                                                   *    CPU     CPU     CPU *   CALLS CALLS *FETCH                                *
*************************************************************************************************************************************
* <7>      <8>          <9>      <10>   <11>   <12> *   <13>   <14>   <15> *   <16>   <17> * <18>   <19>   <20>  <21>  <22>  <23>  *
* ASO000   001          169       .61    .43    .11 *    .01    .03    .00 *    4.9    9.2 *   .0     .0     .0    .0    .0    .0  *
*                                                   *                      *                *                                       *
* ASO200   001          212       .62    .46    .13 *    .02    .04    .00 *    5.9   13.3 *   .0     .0     .0    .0    .0    .0  *
*                                                   *                      *                *                                       *
* ASO400   001           98       .42    .38    .09 *    .01    .04    .00 *    5.1   14.3 *   .0     .0     .0    .0    .0    .0  *
*                                                   *                      *                *                                       *
* ASO500   001          130       .45    .30    .12 *    .01    .02    .00 *    5.7    7.5 *   .0     .0     .0    .0    .0    .0  *
*                                                   *                      *                *                                       *
* ASO600   001           11       .35    .23    .07 *    .01    .02    .00 *    5.0    5.8 *   .0     .0     .0    .0    .0    .0  *
*                                                   *                      *                *                                       *
* BCA000   001        1,880       .46    .21    .14 *    .01    .05    .00 *    4.7   19.2 *   .0     .0     .0    .0    .0    .0  *
*                                                   *                      *                *                                       *
* BCA200   001          940       .41    .22    .11 *    .02    .05    .00 *    4.7   14.4 *   .0     .0     .0    .0    .0    .0  *
*                                                   *                      *                *                                       *
* BCA400   001          322       .27    .21    .10 *    .01    .06    .00 *    5.5   19.8 *   .0     .0     .0    .0    .0    .0  *
*                                                   *                      *                *                                       *
* BCA500   001        1,503       .40    .18    .10 *    .01    .03    .00 *    5.8    9.5 *   .0     .0     .0    .0    .0    .0  *
*                                                   *                      *                *                                       *
* BCA600   001          289       .23    .22    .09 *    .01    .02    .00 *    5.1    7.6 *   .0     .0     .0    .0    .0    .0  *
*                                                   *                      *                *                                       *
*************************************************************************************************************************************
```

Table 6-3 describes Transaction (TRND2) Processing Report elements. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 6-3 Transaction (TRND2) Processing Report Elements (Part 1 of 3)

<1> CURRENT DATE Date this report was generated, in mm/dd/yy format. **Note:** If the response option is in effect, WITH RESPONSE OPTION will appear after the report title.
<2> subtitle Report subtitle, which can be user-specified (see “Report Control Statements” on page 6-19) or a default subtitle (40 characters maximum). The default subtitle is determined by the control statement report code. One report is created for each control statement. Multiple reports are printed in descending sequence by report code. If report code 01 is selected, however, it is always printed first. Report code 01 produces an alphabetic listing.
<3> REPORT NUMBER *xx* The variable *xx* is the report code specified in the report control statement.
<4> REPORT WILL HAVE FIRST *nnnn* TRANSACTIONS LISTED Defines the print limit request specified for this report.

Table 6-3 Transaction (TRND2) Processing Report Elements (Part 2 of 3)

<5>	**REPORTING RANGE REQUESTED** Time range requested for this transaction usage analysis. This range is the same as the range specified in the parameter input data. If the time range selection was not specified, this range is set to equal the ACTUAL REPORTING RANGE FOUND. The range is expressed as the lowest date (yy.ddd) and time (hh.mm) requested through the highest date (yy.ddd) and time (hh.mm) requested.
<6>	**ACTUAL REPORTING RANGE FOUND** Time range encountered for this transaction usage analysis. This range is expressed as the lowest date (yy.ddd) and time (hh.mm) found in the data selected for reporting through the highest date (yy.ddd) and time (hh.mm) found in the data selected.
<7>	**TRANCODE** Name of the transaction being reported.
<8>	**CLS/RTCDE** Identification for the class used to assign the transaction to a specific message region. For Fast Path message–driven transactions, the routing code is used in place of the class.
<9>	**# TRANS** Number of times this transaction was executed during the analysis period.
<10>	**AVG/TRAN RESP** Average transaction response time. The time is in seconds and is derived by finding the difference between the time the transaction arrived in the queue and the time the transaction was completed and messages were ready to send back. Normally, this value is defined as the sum of INPUT QUEUE TIME and ELAPSED TIME. For DBCTL threads and TPI, only elapsed time is reported. If the response option is in effect, it is defined as transaction arrival time (of the original transaction in the case of message switches) to the first attempt to transmit an output message to the originating terminal (log record type X'31'). If no response was made for a transaction, this time is zero. **Notes:** If the response option is in effect, the response time is zero for DBCTL threads and TPI. If a transaction type generally has a response but not always, the average reported here will be artificially low. In the response reports (described in Chapter 9), the averages are accurate even in this case.
<11>	**AVG/TRAN ELAP** Average amount of time, in hundredths of seconds, that this transaction was actively being processed.
<12>	**AVG/TRAN QUEUE** Average queue wait time for the transaction in seconds, calculated as the difference between the time the transaction arrived in the queue and the time that the transaction was started by the message processing program. Normally, this value is defined from the arrival time of the originating transaction. If the response option is in effect, the value is defined from the arrival time of the actual transaction. This definition differs from the normal definition in the case of message switches only. If the response option is in effect, the response time is zero for DBCTL threads and TPI.
<13>	**AVG/TRAN APPL CPU** Average amount of CPU time used by the application program to process the transaction. For more information, see “Application Program CPU” on page 2-7.

Table 6-3 Transaction (TRND2) Processing Report Elements (Part 3 of 3)

<14>	**AVG/TRAN DL/I CPU** Average amount of DL/I CPU time (expressed in seconds) this transaction consumes per execution including buffer handler CPU time. For more information, see “Message DL/I CPU” on page 2-7, “Control DL/I CPU” on page 2-8, “Message Buffer CPU” on page 2-8, and “Control Buffer CPU” on page 2-9.
<15>	**AVG/TRAN DB2 CPU** Average amount of CPU time processing DB2 calls. For more information, see “DB2 CPU” on page 2-8.
<16>	**AVG DL/I /TRAN MSG CALLS** Average number of message DL/I calls per transaction. If DBCTL threads are included, this average is lower because DBCTL threads do not make message calls.
<17>	**AVG DL/I /TRAN DB CALLS** Average number of database DL/I calls per transaction.
<18>	**AVG SQL/TRAN SEL/FETCH** Average number of SQL SELECT and FETCH calls to a DB2 subsystem per transaction.
<19>	**AVG SQL/TRAN OPEN** Average number of SQL OPEN calls to a DB2 subsystem per transaction.
<20>	**AVG SQL/TRAN INSERT** Average number of SQL INSERT calls to a DB2 subsystem per transaction.
<21>	**AVG SQL/TRAN UPD** Average number of SQL UPDATE calls to a DB2 subsystem per transaction.
<22>	**AVG SQL/TRAN DLET** Average number of SQL DELETE calls to a DB2 subsystem per transaction.
<23>	**AVG SQL/TRAN OTHER** Average number of other SQL calls to a DB2 subsystem per transaction.

Job Control Statements

This section describes the JCL required to execute the PRSTRN10, PRSTRNFP, and PRSTRND2 programs. Except for the TEMPFILE DD statement, the JCL statements are the same for all three programs. Figure 6-5 on page 6-16 provides a JCL example.

Table 6-4 PRSTRN10, PRSTRNFP, and PRSTRND2 JCL Statements

Statement	Function
JOB	Initiates the job.
EXEC	Specifies the program name of the transaction usage analysis process as PGM={PRSTRN10 | PRSTRNFP | PRSTRND2 } Also specifies the region and the PARM parameters required to define a time period, system ID, an internal sort size, and response times (see “PARM Options in the EXEC Statement” on page 6-17). The region requirement can be affected by • block size of the IRUF • number of buffers specified for the data sets • internal sort size requirements
STEPLIB DD	Defines the program library (IMF.LOAD) that contains the PRSTRN10, PRSTRNFP, and PRSTRND2 program load modules.
RESUTIL DD	Defines the IRUF used as the input to the analysis. The data set DCB attributes are RECFM=VBS,LRECL=30970,BLKSIZE=30974.
TRNLIST DD	Defines the print data set to contain the program usage reports. The characteristics of the data set are RECFM=FB,LRECL=133. BLKSIZE must be specified explicitly.
TRNLIST2 DD	Defines the print data set to contain the program selection trace report and control statement diagnostic messages. The characteristics of the data set are RECFM=FB,LRECL=133. BLKSIZE must be specified explicitly.
TEMPFILE DD	Defines a temporary file used during the statistics gathering and sorting. The characteristics of the data set are TRN10 RECFM=FB,LRECL=320,BLKSIZE=6400 TRNFP RECFM=FB,LRECL=275,BLKSIZE=6050 TRND2 RECFM=FB,LRECL=280,BLKSIZE=6160
TRNSELEC DD	Defines report control statements, which are described on page 6-19. If the DSN parameter is used to define the data set, the data set characteristics are RECFM=FB,LRECL=80. BLKSIZE must be specified explicitly.
SORTLIB DD	Defines the library for the modules loaded by an internally invoked sort program.
SYSOUT DD	Defines the output class.
SORTWK*nn* DD	Defines work data sets for data sorting; *nn* is a numeric.

Figure 6-5 provides an example of JCL for PRSTRNFP.

Figure 6-5 Sample JCL for PRSTRNFP

```
//JOBNAME  JOB  ..............
//STEP1    EXEC PGM=PRSTRNFP,REGION=192K,
//              PARM='95010,0800,95010,1600,*,090000'
//STEPLIB  DD   DSN=IMF.LOAD,DISP=SHR
//RESUTIL  DD   DSN=IRUF.MONTHS,DISP=SHR,
//              DCB=(RECFM=VBS,LRECL=30970,BLKSIZE=30974)
//TRNLIST  DD   SYSOUT=A,DCB=BLKSIZE=133
//TRNLIST2 DD   SYSOUT=A,DCB=BLKSIZE=133
//TEMPFILE DD   UNIT=SYSDA,SPACE=(CYL,(20,4)),
//              DCB=(RECFM=FB,LRECL=275,BLKSIZE=6050)
//TRNSELEC DD   *
TRN 03 00030
TRN 08 00030
TRN 11 00050
TRN 10 00010 POTENTIAL HIGH DEDB CONTENTION
/*
//SORTLIB  DD   DSN=SYS1.SORTLIB,DISP=SHR
//SYSOUT   DD   SYSOUT=A
//SORTWK01 DD   UNIT=SYSDA,SPACE=(CYL,(20))
//SORTWK02 DD   UNIT=SYSDA,SPACE=(CYL,(20))
//SORTWK03 DD   UNIT=SYSDA,SPACE=(CYL,(20))
//
```

Note: The TEMPFILE DCB must be specified as follows:

```
PRSTRN10:  DCB=(RECFM=FB,LRECL=320,BLKSIZE=6400)
PRSTRNFP:  DCB=(RECFM=FB,LRECL=275,BLKSIZE=6050)
PRSTRND2:  DCB=(RECFM=FB,LRECL=280,BLKSIZE=6160)
```

PARM Options in the EXEC Statement

The PRSTRN10, PRSTRNFP, and PRSTRND2 EXEC statement PARM options can be used to define

- time period selection
- system ID selection
- sort size for the internal sort
- response option

Time Period Selection

This option defines the range of time to be selected for this reporting process. The range is specified as the lowest Julian date (yyddd) and time (hhmm) to the highest Julian date (yyddd) and time (hhmm).

PARM Positions	Options
01 – 21	ldate,ltme,hdate,htme ldate Low Julian date in yyddd format. ltme Low hour/minute in hhmm format. hdate High Julian date in yyddd format. htme High hour/minute in hhmm format.

The value 00000,0000,00000,0000 specifies that the time period selection is not to be invoked.

System ID Selection

This PARM option defines the computing system to be reported.

PARM Positions	Options
22 – 23	,x | ,* x System ID to be selected. * System ID selection is not to be invoked.

Sort Size for the Internal Sort

This option is a six-digit number that specifies the amount of storage for the internal sorting process (from 018000 bytes up to the maximum available main storage).

PARM Positions	Options
24 – 30	,nnnnnn | ,030000 nnnnnn Sort storage size. 030000 Sort storage size default of 30,000 bytes of storage.

Response Option

This option specifies whether to report alternate input queue and response times (R RESPONSE field of the transaction accounting record, described in the *MAINVIEW for IMS Offline – Customization and Utilities Guide*). If the input IRUF was not created with the response option in effect, the response option for the report cannot be specified.

PARM Positions	Options
31 – 32	,R R Specifies the use of the alternate times. If this parameter is not specified, the normal input queue response times are calculated (INPUT QUEUE TIME + ELAPSED TIME).

PARM Options Example

The following example requests a transaction usage analysis on day 02.076 from 8:00 A.M. to 4:00 P.M. All system IDs (*) are to be selected. The storage size for the internal sort is 50,000 bytes. The alternate input queue and response times are used (R).

```
PARM='02076,0800,02076,1600,*,050000,R'
```

Report Control Statements

Transaction processing is selected by the use of positional report control statements. The statement position defines the type of report, selects the transaction analysis to be performed, limits the number of transactions that are reported, and subtitles the report as specified by the user or by default.

Table 6-5 shows report control statement syntax for PRSTRN10, PRSTRNFP, and PRSTRND2.

Table 6-5 Report Statement Syntax – Transaction Processing

Position	Input
01 – 03	Statement ID: TRN
04	Blank
05 – 06	Code for report to be produced. Valid codes are 01 through 20 for PRSTRN10 or PRSTRNFP execution and 01 through 18 for PRSTRND2 execution. For example, a number 10 in this position in a PRSTRN10 control statement requests a report of the transactions with the highest number of MESSAGE GET UNIQUE calls. If a code is not selected, the analysis is reported alphabetically by transaction name (code 01 is the default). If report code 01 is selected and there is more than one control statement, the report for 01 is printed first, followed by the other reports in descending sequence by report code.
07	Blank
08 – 12	A number in this position limits the number of transactions analyzed and reported. If positions 8 through 12 of the control statement contain 00000, all transactions are listed in the report. For example, 00020 limits the report to 20 transactions.
13	Blank
14 – 53	User-specified title. If one is not specified, a default title that is associated with the report code is used.

One report is generated for each defined report control statement, usually in descending sequence by report code. If 01 is selected, however, it is printed first. The order of presentation within a report is the most executions first, except for report code 01 (default). Report code 01 generates an alphabetic report by transaction name.

For example, the control statements for PRSTRNFP processing shown in Figure 6-5 on page 6-16 produce the following four transaction processing analysis reports:

1. The first control statement requests a report of the 30 transactions (00030 in statement position 08 – 12) that have executed most often during this analysis period (report code 03 in statement position 05).

2. The second control statement requests a report of the 30 transactions (00030) that have waited the longest time for Fast Path buffers (report code 08).

3. The third control statement requests a report of the 50 transactions (00050) that had the largest number of Fast Path CI contentions (report code 11).

4. The fourth control statement requests a report of the 10 transactions (00010) that averaged the highest number of CI contentions (report code 10). The subtitle of the report is defined as POTENTIAL HIGH DEDB CONTENTIONS. The default subtitle for REPORT 10 is AVERAGE NUMBER OF FP CI CONTENTIONS.

In the example given above, report 11 is printed first, followed by reports 10, 08, and 03.

As noted above, PRSTRN10, PRSTRNFP, and PRSTRND2 each process a unique set of report codes. The report codes are described in the next three sections.

PRSTRN10 Control Statement Report Codes

The valid report codes for positions 5 and 6 of a PRSTRN10 control statement are listed below.

Code	Description
01	Alphabetic listing by transaction name
02	Transaction class
03	Number of transactions processed
04	Reserved for future use
05	Average transaction response time
06	Average transaction queue wait time
07	Buffer handling CPU time
08	Average message region CPU time
09	Average DL/I CPU time
10	Average number of MESSAGE GET UNIQUE calls
11	Average number of MESSAGE INSERT calls
12	Average number of GET UNIQUE calls
13	Average number of GET NEXT calls
14	Average number of DELETE calls
15	Average number of REPLACE calls
16	Average number of INSERT calls
17	Average number of key reads
18	Average number of nonkey reads
19	Average number of nonkey writes
20	Average number of NO I/O
21	Reserved

PRSTRNFP Control Statement Report Codes

The valid report codes for positions 5 and 6 of a PRSTRNFP control statement are listed below.

Code	Description
01	Alphabetic listing by transaction name
02	Routing code
03	Number of transactions processed
04	Average transaction response time
05	Average FP buffers used
06	Maximum FP buffers used
07	Maximum FP buffer waits
08	Total FP buffer waits
09	Total OBL waits
10	Maximum CI contentions
11	Total CI contentions
12	Total sync point failures
13	Average message calls
14	Maximum message calls
15	Average DEDB calls
16	Maximum DEDB calls
17	Average MSDB calls
18	Maximum MSDB calls
19	Average non-FP calls
20	Maximum non-FP calls
21	Reserved

PRSTRND2 Control Statement Report Codes

The valid report codes for positions 5 and 6 of a PRSTRND2 control statement are listed below.

Code	Description
01	Alphabetic listing by transaction name
02	Transaction class
03	Number of transactions processed
04	Average response time in hundredths of seconds
05	Average elapsed time per transaction
06	Average input queue time in hundredths of seconds
07	Reserved
08	Average message region CPU time in thousandths of seconds
09	Average DL/I CPU time in thousandths of seconds
10	Average DB2 CPU time per transaction
11	Average number of DL/I message calls
12	Average number of DL/I database calls
13	Average number of SQL SELECT/FETCH calls
14	Average number of SQL OPEN calls
15	Average number of SQL INSERT calls
16	Average number of SQL DELETE calls
17	Average number of SQL UPDATE calls
18	Average number of other SQL calls

Return Codes

This section describes the return codes that indicate the results of PRSTRN10, PRSTRNFP, or PRSTRND2 execution.

Code	Explanation
028	Invalid delimiter was found in the time period selection. A required comma is missing or was specified incorrectly.
032	Day is out of range (001 - 366) for the selection low date.
036	Time of day is out of range (0000 - 2359) for the selection low time.
040	Day is out of range (001 - 366) for the selection high date.
044	Time of day is out of range (0000 - 2359) for the selection high time.
048	High date/time selection (yyddd,hhmm) is less than the low date/time (yyddd,hhmm).
052	Invalid system ID delimiter was found. A required comma is missing or was specified incorrectly.
056	System identifier contains a blank or invalid identifier.
060	Invalid sort size delimiter was found. A required comma is missing or was specified incorrectly.
064	Sort size was specified incorrectly. The value given was either not six digits long, not numeric, or less than 18000.
068	Response option code was specified incorrectly.
072	Response option was requested but transaction accounting records were found on the IRUF which were not created with this option (TAR R OPTION not = R).
128	Error was detected in the program selection statement analysis. An error in statement format or content was encountered.
132	First internal sort (alpha sort) returned with an unsuccessful status.
136	Reports were requested but no program statistics were found within the requested range.
140	Second internal sort (report sequencing) returned with an unsuccessful status.
144	IRUF containing no TAR (transaction accounting record) was used as input to the transaction processing analysis. The file described in the RESUTIL DD statement must contain at least one TAR.

Chapter 7 General Activity Analysis Reports (PRSACTIV)

The PRSACTIV report program is used to evaluate and control DL/I database, DB2 subsystem, and logical terminal usage.

Objectives:

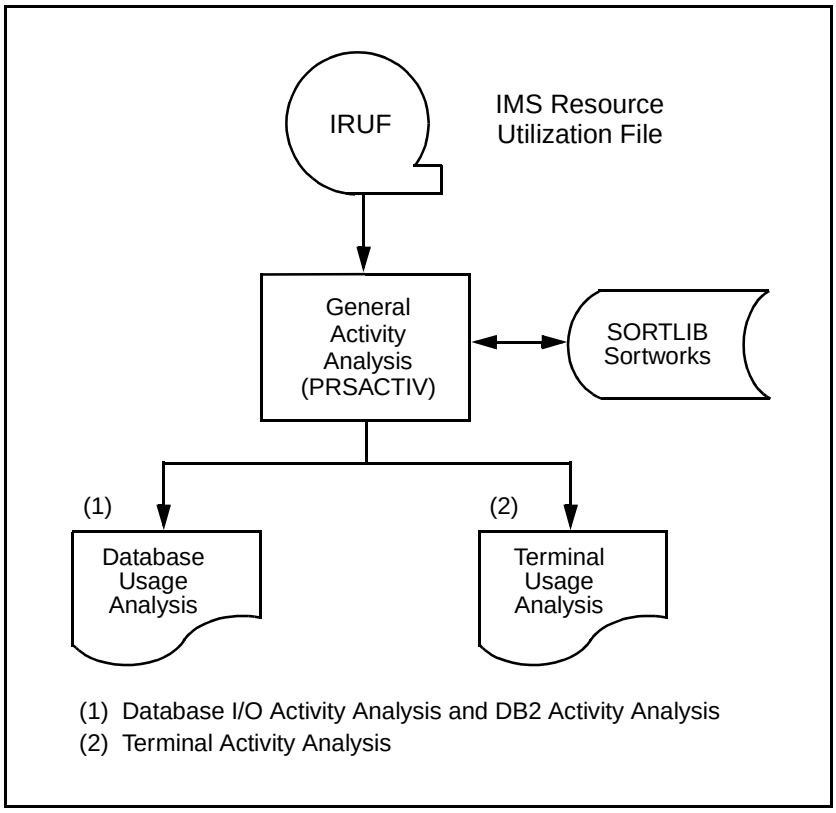
- Quantify the logical number of requests issued to each database and DB2 subsystem in total and by program.
- Quantify the physical I/O issued to each database (key and nonkey) and DB2 subsystem data retrieval (SQL SELECT and FETCH calls) in total and by program.
- Quantify the number of times I/O requests issued to each database were satisfied by records resident in buffers.
- Quantify the amount of connect time charged to each terminal.
- Quantify the activity associated with each logical terminal.

Uses:

- Isolate the databases and DB2 subsystems responsible for most of the system workload.
- Identify databases requiring reorganization because of excessive overflow activity.
- Isolate low-activity databases or DB2 application plans.
- Identify underutilized terminals.
- Isolate the logical terminals that have their capacity saturated.

Figure 7-1 shows the system flow for PRSACTIV.

Figure 7-1 PRSACTIV System Flow



Input and Output

Database, DB2, and terminal activity is analyzed by batch execution of PRSACTIV against a detail or summarized IRUF file, as shown in Figure 7-1. The PRSACTIV report program produces a

- Database I/O Activity Analysis report
- DB2 Activity Analysis report
- Terminal Activity Analysis report

Report Element Descriptions

This section describes each element of the reports produced by the PRSACTIV batch report program.

Database I/O Activity Analysis Report

DBCTL Threads:

DBCTL CICS and ODBA thread activity can be reported by PRSACTIV for this report. The following considerations apply:

- CICS=YES or CICS=OFFLINE must be specified for the Event Collector in BBPARM member IMFECP00.
- Message region CPU time for DBCTL threads represents only the CPU time used to process the DL/I calls.
- All report fields are valid for DBCTL threads.

Figure 7-2 shows an example of the Database I/O Activity Analysis report.

Figure 7-2 Database I/O Activity Analysis Report

```
**** IMF ****                                  IMS PERFORMANCE REPORTER                                          **** IMF ****
CURRENT DATE - 03/22/yy <1>                  DATABASE I/O ACTIVITY ANALYSIS                                      PAGE NO.    2
*************************************************************************************************************************
*                              *            *                                    *                                 *
*                              *            *                DATABASE  I/O ACTIVITY          *                DL/I REQUESTS              *
*                    NUMBER OF   *  DMB   DBD  *  KEY     KEY   NONKEY   NONKEY    NO    *    GET      GET                              *
* DBDNAME  PROGRAM  TRANSACTIONS *  SIZE  TYPE * READS  WRITES   READS   WRITES    I/O   *  UNIQUE    NEXT  INSERT  DELETE  REPLACE*
*                              *            *                                    *                                 *
*************************************************************************************************************************
* <2>      <3>              <4>  *            *   <8>     <9>    <10>    <11>     <12>  *    <13>    <14>    <15>    <16>    <17> *
* KZZP09   KNVS630            84  *            *    89       0     17K   2014       62K *     17K   4880       0       0    4282 *
* KZZP09   KNVS668             1  *       <5>  *   250       0     59K      0     288K *     49K   100K       0       0       0 *
* KZZP09   KNVS668            20  *       SB   *  4974       0    1100K      0    5625K *    962K   1955K      0       0       0 *
* KZZP09   KNVS750           142  *            *     0       0     6862    3192      43K *    2468      0    2399       0       0 *
* KZZP09   KNVS750             5  *       SB   *     0       0     2523     212      15K *     174      0     169       0       0 *
* KZZP09   KNVS751           147  *            *     0       0     4795     37K     844K *      10K      0      22K      0      10K*
* KZZP09   KNVS754           147  *            *     0       0      410       0      20K *    2557    6652       0       0       0 *
* KZZP09   KNVS760           498  *            *  1174       0      12K    8346     2804K *     24K   4037       0       0    8096 *
* KZZP09   KNVS761           200  *            *   108       0     1650      37       19K *    6704    1575       0       0      52 *
* KZZP09   KNVS768             5  *            *     0       0     4259    1836      37K *    8397     14K       0       0    3029 *
* KZZP09   KNVS768             1  *       SB   *     0       0     1264     959      31K *    4518    8554       0       0    1715 *
* KZZP09   KNVS769             9  *            *     0       0     3590    2505      27K *    5671       0       0       0    4124 *
* KZZP09   KNVS769             1  *       SB   *     0       0      719     929      10K *    1953       0       0       0    1707 *
* KZZP09   KNVS870            21  *            *   257       0      200       0     1438  *     350     310       0       0       0 *
*                              *  <6>  <7>  *                                    *                                 *
* KZZP09   **TOTALS       16,035  *  2432 HDAM *    17K      0    2759K     65K   18879K *    2152K   3080K     25K      0      43K*
*                              *            *                                    *                                 *
* KZZP10   KUM9A04             2  *            *     0       0       0       0        4  *       2       0       0       0       0 *
*                              *            *                                    *                                 *
* KZZP10   **TOTALS            2  *  1608 HDAM *     0       0       0       0        4  *       2       0       0       0       0 *
*                              *            *                                    *                                 *
*                              *            *                                    *                                 *
*************************************************************************************************************************
* ALL I/O TOTALS THAT EXCEED 10000 WILL BE PRINTED IN UNITS OF 1000 FOLLOWED BY K (EG,18361 IS PRINTED AS 18K) <20>                *
* TIME PERIODS (SELECTED) yy.152 05.41 TO yy.152 05.47 (ENCOUNTERED) yy.152 05.41 yy.152 05.47                                  *
*************************************************************************************************************************
               <18>                                  <19>
```

Statistics are provided on a combination database and program level in the detail line, with database totals indicated by **TOTALS in the program name field.

Table 7-1 describes Database I/O Activity Analysis report elements. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 7-1 Database I/O Activity Analysis Report Elements (Part 1 of 2)

<1>	**CURRENT DATE** Date this report was generated, in mm/dd/yy format.
<2>	**DBDNAME** Name of the database being reported. There are two DBDNAMEs that may be generated internally by MVIMS – OTHERS and ALLDBS. OTHERS is described in the Event Collector chapter (DBTS parameter in the collection options table) in the *MAINVIEW for IMS Offline – Customization and Utilities Guide*. ALLDBS is described under the option DBIO=IOWAITS on page 2-5 and page 2-13 of Chapter 2, “Event Collector Options” in this manual.
<3>	**PROGRAM** Name of the program accessing the database specified in DBDNAME.
<4>	**NUMBER OF TRANSACTIONS** Number of times that transactions were processed and required at least one reference to the database.
<5>	**SB** Indicates that sequential buffering was in effect for the activity reported on a line. If the program had activity without sequential buffering, there will be a separate line of information for that activity.
<6>	**DMB SIZE** Largest amount of main storage required out of the DMB pool to contain data pertinent to this database.
<7>	**DBD TYPE** Type of organization used for this database (for example, HIDAM, HISAM). For logical databases, this value is the type of the first physical database referenced. For MSDBs, the following designations are used: MDBNK MSDB, nonrelated, key in data MDBNL MSDB, nonrelated, LTERM key MDBRF MSDB, related, fixed MDBRD MSDB, related, dynamic
<8>	**KEY READS** Number of physical I/O reads issued to this database’s key area. A key area is considered a VSAM key sequence data set. For more information, see “Database Reads” on page 2-12.
<9>	**KEY WRITES** Number of physical I/O writes issued to this database’s key area. For more information, see “Database Writes” on page 2-13.

Table 7-1 Database I/O Activity Analysis Report Elements (Part 2 of 2)

<10> NONKEY READS	Number of physical I/O reads issued to this database's nonkey area. A nonkey area is considered an OSAM or VSAM entry sequence data set. For more information, see "Database Reads" on page 2-12.
<11> NONKEY WRITES	Number of physical I/O writes issued to this database's nonkey area. A nonkey area is considered an OSAM or VSAM entry sequence data set. For more information, see "Database Writes" on page 2-13.
<12> NO I/O	Number of times that references were made to records contained in the database, and the reference was satisfied without a physical I/O required because the desired record was contained in the buffer pool. For more information, see "NO I/O" on page 2-13.
<13> GET UNIQUE	Number of GET UNIQUE calls issued to this database.
<14> GET NEXT	Number of GET NEXT calls issued to this database.
<15> INSERT	Number of INSERT and PURGE calls issued to this database.
<16> DELETE	Number of DELETE calls issued to this database.
<17> REPLACE	Number of REPLACE calls issued to this database.
<18> TIME PERIODS (SELECTED)	Time range requested for this database usage analysis. This range is the same as that specified with the PARM option of the EXEC statement. If the time range selection was not specified, this range is set to equal the range encountered. The range is expressed as the lowest date (yy.ddd) and time (hh.mm) requested through the highest date (yy.ddd) and time (hh.mm) requested.
<19> TIME PERIODS (ENCOUNTERED)	Time range encountered for database usage analysis. This range is expressed as the lowest date (yy.ddd) and time (hh.mm) through the highest date (yy.ddd) and time (hh.mm) found in the data selected.
<20> report footnote	If the value to be displayed is greater than 1,000, the number actually printed is expressed in units of 1,000 (K). For example, if the value 15,211 is to be displayed, the report will show 15K.

DB2 Activity Analysis Report

DBCTL Threads:

DBCTL thread activity is not reported, because DBCTL threads cannot access DB2 through the IMS External Subsystem Attach Facility.

Figure 7-3 provides an example of a DB2 Activity Analysis report.

Figure 7-3 DB2 Activity Analysis Report

```
**** IMF ****                                        IMS PERFORMANCE REPORTER                                          **** IMF ****
CURRENT DATE - 03/22/yy <1>                         DATABASE 2 ACTIVITY ANALYSIS                                       PAGE NO.    1
*****************************************************************************************************************************************
*                               *                                                                                                       *
*                               *                           DATABASE  2  REQUESTS                                                       *
*                      NUMBER OF *                                                                                                      *
* PLANNAME  SSID  TRANSACTIONS *  SELECT/     OPEN   INSERT   DELETE   UPDATE      DDL  DYNAMIC  CONTROL    OTHER           TOTAL  *
*                               *    FETCH                                                                                              *
*****************************************************************************************************************************************
* <2>       <3>            <4> *      <5>      <6>      <7>      <8>      <9>     <10>     <11>     <12>     <13>            <14>  *
* P87165    DBPR            22 *       23        0       62        1        3        0        0        0        0              89  *
* P87197    DBPR            19 *        0        0       22        0        0        0        0        0        0              22  *
* P87561    DBPR            29 *        0        0       30        0        0        0        0        0        0              30  *
* P87562    DBPR            81 *        0        0      113        0        0        0        0        0        0             113  *
* P87585    DBPR            29 *        0        0       31        0        0        0        0        0        0              31  *
*                               *                                                                                                       *
* **TOTALS                 180 *       23        0      258        1        3        0        0        0        0             285  *
*                               *                                                                                                       *
*                               *                                                                                                       *
*****************************************************************************************************************************************
* ALL I/O TOTALS THAT EXCEED 10000 WILL BE PRINTED IN UNITS OF 1000 FOLLOWED BY K (EG,18361 IS PRINTED AS 18K) <17>                    *
* TIME PERIODS (SELECTED) yy.210 11.25 TO yy.210 16.30 (ENCOUNTERED) yy.210 11.25 yy.210 16.30                                         *
*****************************************************************************************************************************************
                  <15>                                        <16>
```

Table 7-2 describes DB2 Activity Analysis report elements. The reference numbers (with the <**n**> format) match the elements in the report example pages to the elements described in the table.

For information about how MVIMS measures the number of DB2 calls, see “DB2 Subsystem Activity” on page 2-14.

Table 7-2 DB2 Activity Analysis Report Elements (Part 1 of 2)

<1> CURRENT DATE Date this report was generated, in mm/dd/yy format.
<2> PLANNAME Name of the DB2 application plan being reported.
<3> SSID Identification code of the DB subsystem.
<4> NUMBER OF TRANSACTIONS Number of times that transactions were processed and required at least one request to the DB2 subsystem.

Table 7-2 DB2 Activity Analysis Report Elements (Part 2 of 2)

<5>	**SELECT/FETCH** Number of SQL SELECT or FETCH calls for this DB2 application plan.
<6>	**OPEN** Number of SQL OPEN calls for this DB2 application plan.
<7>	**INSERT** Number of SQL INSERT calls for this DB2 application plan.
<8>	**DELETE** Number of SQL DELETE calls for this DB2 application plan.
<9>	**UPDATE** Number of SQL UPDATE calls for this DB2 application plan.
<10>	**DDL** Number of SQL data definition language calls (CREATE, ALTER, COMMENT, DROP, and LABEL) for this DB2 application plan.
<11>	**DYNAMIC** Number of SQL dynamic calls (PREPARE, DESCRIBE, and EXECUTE) for this DB2 application plan.
<12>	**CONTROL** Number of SQL control-type calls (GRANT, REVOKE) for this DB2 application plan.
<13>	**OTHER** Number of other SQL calls (EXPLAIN, LOCK, LABEL, CLOSE) for this DB2 application plan.
<14>	**TOTAL** Sum of all the SQL calls for this DB2 application plan.
<15>	**TIME PERIODS (SELECTED)** Time range requested for DB2 usage analysis. This range is the same as that specified with the PARM option of the EXEC statement. If the time range selection was not specified, this range is set to equal the range encountered. The range is expressed as the lowest date (yy.ddd) and time (hh.mm) requested through the highest date (yy.ddd) and time (hh.mm) requested.
<16>	**TIME PERIODS (ENCOUNTERED)** Time range encountered for DB2 usage analysis. This range is expressed as the lowest date (yy.ddd) and time (hh.mm) through the highest date (yy.ddd) and time (hh.mm) found in the data selected.
<17>	**report footnote** If the value to be displayed is greater than 1,000, the number actually printed is expressed in units of 1,000 (K). For example, if the value 15,211 is to be displayed, the report will show 15K.

Terminal Activity Analysis Report

DBCTL Threads:

DBCTL CICS and ODBA thread activity can be reported by PRSACTIV for this report. The following considerations apply:

- CICS=YES or CICS=OFFLINE must be specified for the Event Collector in BBPARM member IMFECP00.
- Message region CPU time for DBCTL threads represents only the CPU time used to process the DL/I calls.
- LTERM name for CICS threads is the four-byte CICS terminal ID.

Figure 7-4 provides an example of the Terminal Activity Analysis report.

Figure 7-4 Terminal Activity Analysis Report

```
**** IMF ****                                    IMS PERFORMANCE REPORTER                                          **** IMF ****
CURRENT DATE - 03/22/yy <1>                     TERMINAL ACTIVITY ANALYSIS                                        PAGE NO.    1
*************************************************************************************************************************
*                         *                                                 *                                           *
* LOGICAL   TYPE  NUMBER  *    SESSION CONNECT TIME      NUMBER OF   RESPONSE  *             MESSAGE CHARACTER COUNTS      *
* TERMINAL        SESSIONS *      TOTAL     AVERAGE     TRANSACTIONS TIME (AVG) *     TOTAL IN      TOTAL OUT     AVG IN  AVG OUT   *
*                         *     HH.MM.SS   HH.MM.SS                  (SECS)   *                                           *
*                         *                                                 *                                           *
*************************************************************************************************************************
* <2>       <3>       <4> *      <5>        <6>               <7>      <8>     *        <9>          <10>         <11>     <12>   *
* J0761190  LEASE       1 *      0.05.53    0.05.53             3      0.09    *        2,240        2,333        746      777    *
*                         *                                                 *                                           *
* K0761190  LEASE       1 *      0.05.53    0.05.53             1      0.23    *          114          145        114      145    *
*                         *                                                 *                                           *
* L0761190  LEASE       1 *      0.05.53    0.05.53             4      0.38    *        2,483        2,521        620      630    *
*                         *                                                 *                                           *
* M0761190  LEASE       1 *      0.05.53    0.05.53             1      0.09    *          114          145        114      145    *
*                         *                                                 *                                           *
* O0760490  LEASE       1 *      0.05.53    0.05.53             3      0.35    *        2,240        2,333        746      777    *
*                         *                                                 *                                           *
*************************************************************************************************************************
* ALL CHARACTER COUNTS THAT EXCEED 10000 WILL BE PRINTED IN UNITS OF 1000 FOLLOWED BY K (EG, 18361 IS PRINTED AS 18K) <15>      *
* TIME PERIODS (SELECTED) yy.152 05.41 TO yy.152 05.47 (ENCOUNTERED) yy.152 05.41 yy.152 05.47                           *
*************************************************************************************************************************
  <13>                                          <14>
```

Table 7-3 describes Terminal Activity Analysis report elements. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 7-3 Terminal Activity Analysis Report Elements (Part 1 of 2)

<1>	**CURRENT DATE** Date this report was generated, in mm/dd/yy format.
<2>	**LOGICAL TERMINAL** Name of the logical terminal being reported. The name ??-BLANK is a generated name assigned in the log edit process for BMP and JBP transactions not related to an LTERM. For DBCTL CICS threads, this name is the CICS terminal ID.
<3>	**TYPE** Type of terminal, indicated as connected at IMS startup (lease) or dialup (dial).
<4>	**NUMBER SESSIONS** Number of terminal sessions measured for this time period. For a leased line, this value is the number of IMS sessions. For a dialup line, this value is a count of the number of dialup sessions.
<5>	**SESSION CONNECT TIME - TOTAL HH.MM.SS** Total amount of time this terminal was connected online. For dialup terminals, this value reflects the sum of all logon sessions. For leased line and CICS terminals, this value reflects the sum of all connect times, defined as the period of time from IMS start (or first timed action) to IMS stop (or last timed action). This time is expressed as hours, minutes, and seconds (hh.mm.ss).
<6>	**SESSION CONNECT TIME - AVERAGE HH.MM.SS** Average time of a connect session. This average is derived by dividing the total session connect time by the number of sessions. This time is expressed as hours, minutes, and seconds (hh.mm.ss).
<7>	**NUMBER OF TRANSACTIONS** Number of transactions processed through this logical terminal.
<8>	**RESPONSE TIME (AVG) (SEC)** Average response time realized for all transactions processed through this LTERM. Time is in seconds and hundredths of seconds. This time is defined as the sum of INPUT QUEUE TIME and ELAPSED TIME.
<9>	**MESSAGE CHARACTER COUNTS TOTAL IN** Total number of input message characters from this logical terminal. This value reflects input received from the originating LTERM (after MFS). For DBCTL threads, this field is zero.
<10>	**MESSAGE CHARACTER COUNTS TOTAL OUT** Total number of output message characters for this logical terminal. This value reflects traffic output to the originating LTERM (prior to MFS). For DBCTL threads, this field is zero.

Table 7-3 Terminal Activity Analysis Report Elements (Part 2 of 2)

<11>	**MESSAGE CHARACTER COUNTS AVG IN** Average number of characters of input per transaction for this LTERM. This value is derived by dividing MESSAGE CHARACTER COUNTS - TOTAL IN by NUMBER OF TRANSACTIONS. For DBCTL threads, this field is zero.
<12>	**MESSAGE CHARACTER COUNTS AVG OUT** Average number of characters of output per transaction for this LTERM. This value is derived by dividing MESSAGE CHARACTER COUNTS - TOTAL OUT by NUMBER OF TRANSACTIONS. For DBCTL threads, this field is zero.
<13>	**TIME PERIODS (SELECTED)** Time range requested for terminal usage analysis. This range is the same as that specified with the PARM option of the EXEC statement. If the time range selection was not specified, this range is set to equal the range encountered. The range is expressed as the lowest date (yy.ddd) and time (hh.mm) requested through the highest date (yy.ddd) and time (hh.mm) requested.
<14>	**TIME PERIODS (ENCOUNTERED)** Time range encountered for terminal usage analysis. This range is expressed as the lowest date (yy.ddd) and time (hh.mm) through the highest date (yy.ddd) and time (hh.mm) found in the data selected.
<15>	**report footnote** If the value to be displayed is greater than 1,000, the number actually printed is expressed in units of 1000s (K). For example, if the value 15,211 is to be displayed, the report will show 15K.

Job Control Statements

This section describes the JCL statements required to execute the PRSACTIV program. Figure 7-5 on page 7-12 provides a JCL example.

Table 7-4 PRSACTIV JCL Statements

Statement	Function
JOB	Initiates the job.
EXEC	Specifies the program name of the general I/O activity analysis process as PGM=PRSACTIV Also specifies the region and the PARM parameters required to define a time period, system ID, an internal sort size, and response times (see "PARM Options in the EXEC Statement" on page 7-13). The region requirement can be affected by • block size of the IRUF • number of buffers specified for the data sets • internal sort size requirements
STEPLIB DD	Defines the program library (IMF.LOAD) that contains the PRSACTIV program load module.
RESUTIL DD	Defines the IRUF used as the input to the analysis. The data set DCB attributes are RECFM=VBS,LRECL=30970,BLKSIZE=30974.
PRNTFILE DD	Defines the print data set to contain the Database I/O Activity Analysis, DB2 Analysis, and Terminal Activity Analysis reports. The characteristics of the data set are RECFM=FB,LRECL=133. BLKSIZE must be specified explicitly.
SELTRACE DD	Defines the print data set to contain the control statement diagnostic messages and the Database (DB2) Selection Trace report. The characteristics of the data set are RECFM=FB,LRECL=133. BLKSIZE must be specified explicitly.
SORTIN DD	Defines a temporary file used during the statistics gathering and sorting. The characteristics of the data set are RECFM=FB,LRECL=328. BLKSIZE must be specified explicitly.
SELECTS DD	Defines report control statements, which are described on page 7-14. If the DSN parameter is used to define the data set, the data set characteristics are RECFM=FB,LRECL=80.
SORTLIB DD	Defines the library for the modules loaded by an internally invoked sort program.
SYSOUT DD	Defines the output class.
SORTWK*nn* DD	Defines work data sets for data sorting; *nn* is a numeric.

Figure 7-5 provides an example of JCL for PRSACTIV.

Figure 7-5 Sample JCL for PRSACTIV

```
//JOBNAME  JOB  ..............
//STEP1    EXEC PGM=PRSACTIV,REGION=192K,
//              PARM='95010,0800,95010,1600,*,090000'
//STEPLIB  DD   DSN=IMF.LOAD,DISP=SHR
//RESUTIL  DD   DSN=IRUF.MONTHS,DISP=SHR,
//              DCB=(RECFM=VBS,LRECL=30970,BLKSIZE=30974)
//PRNTFILE DD   SYSOUT=A,DCB=BLKSIZE=133
//SELTRACE DD   SYSOUT=A,DCB=BLKSIZE=133
//SORTIN   DD   UNIT=SYSDA,SPACE=(CYL,(20,4)),
//              DCB=(RECFM=FB,LRECL=328,BLKSIZE=6232)
//SELECTS  DD   *
DBD LDBDZZ01 DBDPAY01 DBDPAY07
DBD MASTERPR
/*
//SORTLIB  DD   DSN=SYS1.SORTLIB,DISP=SHR
//SYSOUT   DD   SYSOUT=A
//SORTWK01 DD   UNIT=SYSDA,SPACE=(CYL,(20))
//SORTWK02 DD   UNIT=SYSDA,SPACE=(CYL,(20))
//SORTWK03 DD   UNIT=SYSDA,SPACE=(CYL,(20))
//
```

PARM Options in the EXEC Statement

The PRSACTIV EXEC statement PARM options can be used to define

- time period selection
- system ID selection
- sort size for the internal sort
- response option

Time Period Selection

This option defines the range of time to be selected for this reporting process. The range is specified as the lowest Julian date (yyddd) and time (hhmm) to the highest Julian date (yyddd) and time (hhmm).

PARM Positions	Options
01 – 21	ldate,ltme,hdate,htme ldate Low Julian date in yyddd format. ltme Low hour/minute in hhmm format. hdate High Julian date in yyddd format. htme High hour/minute in hhmm format.

The value 00000,0000,00000,0000 specifies that the time period selection is not to be invoked.

Note: Time period selection does not limit the scope of the Terminal Activity report since the report is created from logical terminal activity records (LARs), which contain only terminal connect timestamps.

System ID Selection

This PARM option defines the computing system to be reported.

PARM Positions	Options
22 – 23	,x | ,* x System ID to be selected. * System ID selection is not to be invoked.

Sort Size for the Internal Sort

This option is a six-digit number that specifies the amount of storage for the internal sorting process (from 018000 bytes up to the maximum available main storage).

PARM Positions	Options
24 – 30	,nnnnnn | ,030000 nnnnnn Sort storage size. 030000 Sort storage size default of 30,000 bytes of storage.

Response Option

This option specifies the I/O activity analysis to be reported.

PARM Positions	Options
31 – 32	,D | ,L | ,* D Produces the Database I/O Activity Analysis report and the DB2 Activity Analysis report. L Produces only the Terminal Analysis report. * Produces all the reports (the default).

PARM Options Example

The following example requests a report of terminal activity analysis for day 02.076 from 8:00 A.M. to 4:00 P.M. All system IDs (*) are to be selected. The internal sort storage size is 50,000 bytes.

```
PARM='02076,0800,02076,1600,*,050000,L'
```

Report Control Statements

PRSACTIV reports all database, DB2 subsystem, and terminal activity when no control statements are specified (which is the default).

Control statements are used to select a specific database or DB2 application plan by name. The statement position identifies the name of the database or DB2 application plan for activity analysis reporting. From 1 to 128 database or DB2 application plan names can be selected.

Database I/O Activity Analysis

Table 7-5 shows report control statement syntax for database I/O activity.

Table 7-5 Report Statement Syntax – Database I/O Activity Analysis

Position	Input
01 – 03	Statement ID: DBD
04	Blank
05 – 12	Database identifier 1, with the following format: Format: Database name, left-justified and padded with blanks on the right if the name is less than eight characters long
13	Blank
14 – 21	Database identifier 2 (same format as database identifier 1)
22	Blank
23 – 30	Database identifier 3 (same format as database identifier 1)
31	Blank
32 – 39	Database identifier 4 (same format as database identifier 1)
40	Blank
41 – 48	Database identifier 5 (same format as database identifier 1)
49	Blank
50 – 57	Database identifier 6 (same format as database identifier 1)
58	Blank
59 – 66	Database identifier 7 (same format as database identifier 1)
67	Blank
68 – 75	Database identifier 8 (same format as database identifier 1)

The report control statements, shown in Figure 7-5 on page 7-12, report I/O activity analysis for four databases: LDBDZZ01, DBDPAY01, DBDPAY07, and MASTERPR.

DB2 Activity Analysis

Table 7-6 shows report control statement syntax for DB2 activity analysis.

Table 7-6 Report Statement Syntax – DB2 Activity Analysis

Position	Input
01 – 03	Statement ID: DB2
04	Blank
05 – 12	Plan name identifier 1 Format: DB2 application plan name, left-justified and padded on the right with blanks if the name is less than eight characters long
13	Blank
14 – 21	Plan name identifier 2 (same format as plan name identifier 1)
22	Blank
23 – 30	Plan name identifier 3 (same format as plan name identifier 1)
31	Blank
32 – 39	Plan name identifier 4 (same format as plan name identifier 1)
40	Blank
41 – 48	Plan name identifier 5 (same format as plan name identifier 1)
49	Blank
50 – 57	Plan name identifier 6 (same format as plan name identifier 1)
58	Blank
59 – 66	Plan name identifier 7 (same format as plan name identifier 1)
67	Blank
68 – 75	Plan name identifier 8 (same format as plan name identifier 1)

Return Codes

This section describes the return codes that indicate the results of PRSACTIV execution.

Code	Explanation
028	Invalid delimiter was found in the time period selection. A required comma is missing or was specified incorrectly.
032	Day is out of range (001 - 366) for the selection low date.
036	Time of day is out of range (0000 - 2359) for the selection low time.
040	Day is out of range (001 - 366) for the selection high date.
044	Time of day is out of range (0000 - 2359) for the selection high time.
048	High date/time selection (yyddd,hhmm) is less than the low date/time (yyddd,hhmm).
052	Invalid system ID delimiter was found. A required comma was incorrect.
056	System identifier contains a blank or invalid identifier.
060	Invalid sort size delimiter was found. A required comma was incorrect.
064	Sort size was specified incorrectly. The value given was not six digits long, not numeric, or less than 018000.
068	Invalid report selection delimiter was found. A required comma was missing or incorrectly specified.
072	Report selection code was specified incorrectly. Must be L, D, or *.
132	Invalid DBD selection statement was found. Columns 68 through 75 should not contain a sequence number.
136	Internal sort returned with an unsuccessful sort status.
140	None of the input IRUF records met the criteria established with the PARM parameters.
144	No IRUF records were found on input file.

Chapter 8 Graphical Analysis Reports (PRSPLT00)

The Graphical Analysis Facility generates a wide variety of graphical plot reports. You can use the plot reports to analyze individual usage trends of many system resources and to identify potential degradation factors. IMS input/output activity, CPU utilization, message traffic, transaction execution overhead, transaction response time, and database or DB2 subsystem usage can be graphed.

Objectives:

- Illustrate:
  - response time and its fluctuation over time
  - IMS overhead and variations over time, including buffer handler CPU time, open/close CPU overhead, and program scheduling times
  - usage of IMS and resultant variations over time
  - database and DB2 subsystem activity and usage variations over time
  - message region activity and usage variations over time
- Display:
  - a graphical analysis for short time periods (several hours presents a usage profile)
  - a graphical analysis for long time periods (many months or years presents a trend analysis)
- Select analysis for specific systems, databases, DB2 subsystems, and message regions

Uses:

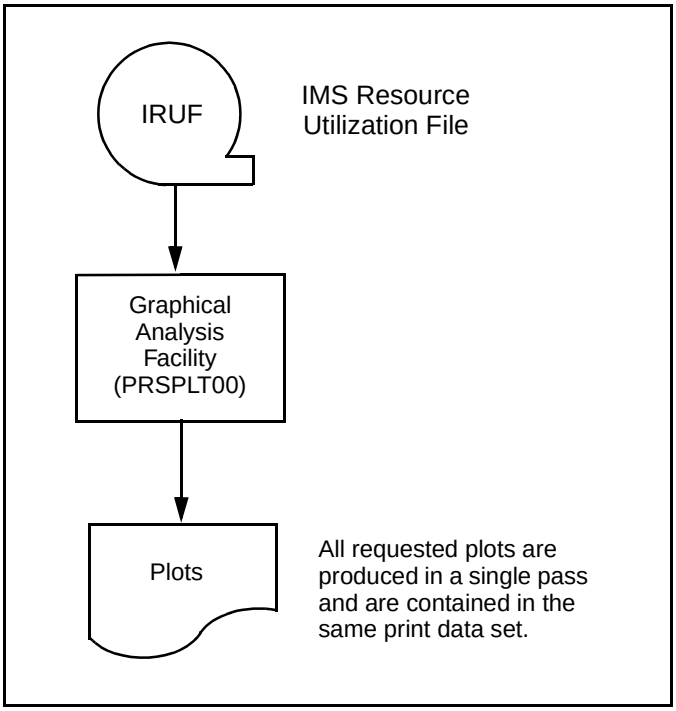
- Analyze IMS overhead categories as they relate to each other and the IMS workload, better enabling the user to estimate the real capacity used and available.

- Systematically evaluate the growth pattern of IMS and the IMS workload, assisting in setting accurate hardware requirements.

- Identify the high and low usage periods on the system so that IMS usage can be optimally scheduled.

Figure 8-1 shows system flow for PRSPLT00.

Figure 8-1 PRSPLT00 System Flow



Input and Output

The Graphical Analysis Facility generates a variety of plots, using the IMS data collected in the IRUF file and user-selected control statements during a single PRSPLT00 batch execution. The report control statements report and select the IRUF data and define the X-axis and the Y-axis of a plot.

REPORT, XAXIS, YAXIS, and SELECT statements are read and a queue or list of plot requests is constructed. The plots are created one at a time by the plot generator when end-of-file is reached on the IRUF data file.

If the input is a detail IRUF, plots by time of day can be produced. If the input is a summarized IRUF or multiple detail IRUFs, plots by date can be created.

Report Element Descriptions

DBCTL Threads:

DBCTL CICS and ODBA thread activity can be reported by PRSPLT00. The following considerations apply:

- CICS=YES or CICS=OFFLINE must be specified for the Event Collector in BBPARM member IMFECP00.
- The following plots are not appropriate for DBCTL threads:
  - all plots pertaining to DB2 or SQL
  - all plots pertaining to input queue time
  - all plots using the response option
  - core allocation
  - core utilization
  - Message Transfer (Input/Output) Character Count plot

Figure 8-2 provides an example of a Graphical Analysis Facility plot report.

Figure 8-2 Graphical Analysis Facility Plot Report

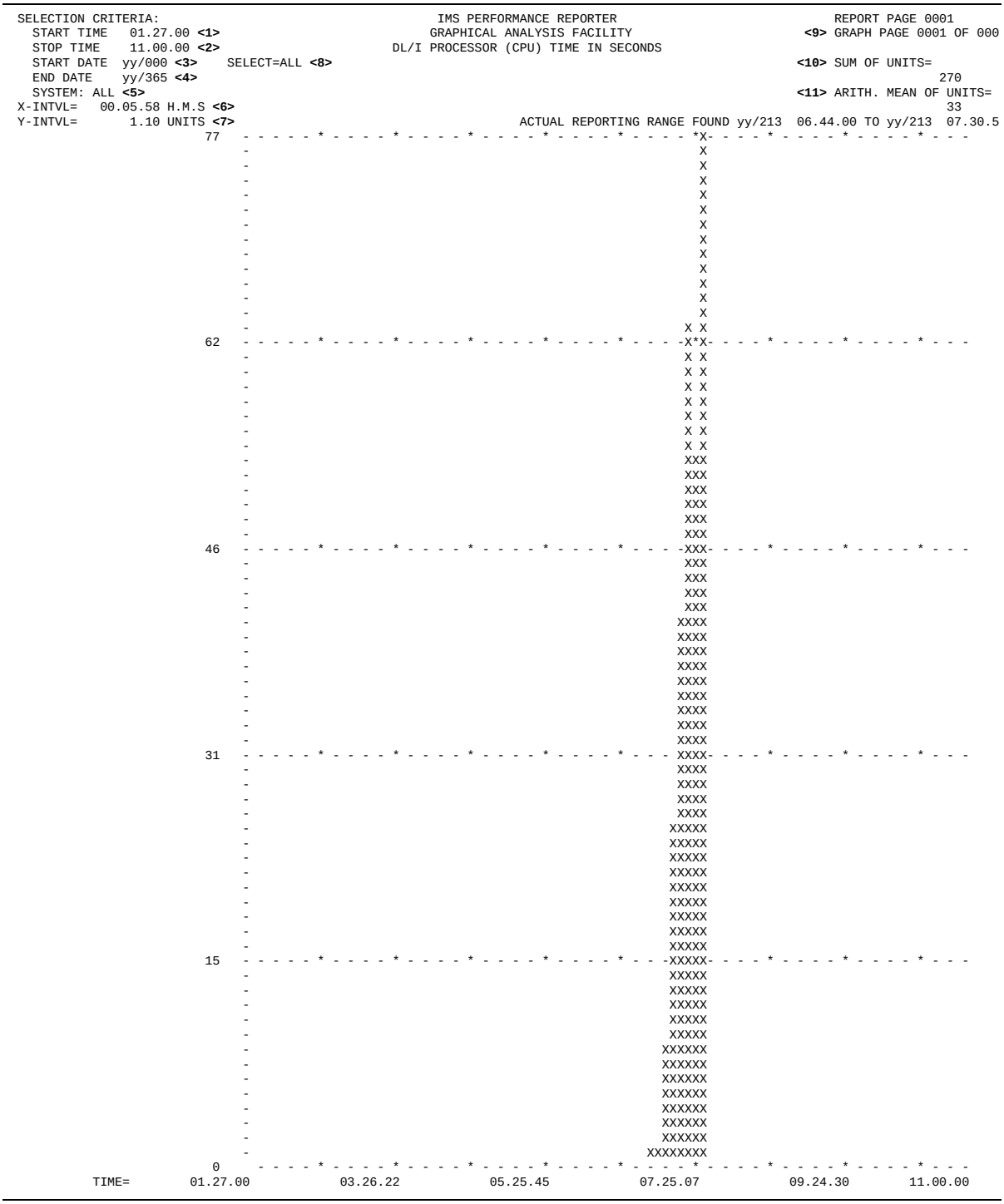


Table 8-1 describes Graphical Analysis Facility plot report elements. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 8-1 Graphical Analysis Facility Plot Elements

<1> START TIME Time of day, expressed as hh.mm.ss, used as the low time for data inclusion in the plot.
<2> STOP TIME Time of day, expressed as hh.mm.ss, used as the high time for data inclusion in the plot.
<3> START DATE Julian date, expressed as yy/ddd, used as the low date for data inclusion in the plot.
<4> END DATE Julian date, expressed as yy/ddd, used as the high date for data inclusion in the plot.
<5> SYSTEM: Names of the system IDs included in this plot analysis. ALL implies that data from all system IDs was accepted.
<6> X-INTVL= Value of one X-axis interval, expressed as hh.mm.ss.
<7> Y-INTVL= Value of one Y-axis interval, expressed as units.
<8> SELECT= Specific selection options invoked for this plot analysis: • all data selected • data for named message regions • data for named databases • data for named LTERMS • data for named transaction codes • data for named routing codes
<9> GRAPH PAGE Page number of the graph when the graph spans more than one page horizontally. For example, if the X-axis were defined to have 200 intervals, it would take two pages to display the plot, the first being graph page 0001 and the second being graph page 0002.
<10> SUM OF UNITS= Sum of all values evaluated during processing of this plot.
<11> ARITH. MEAN OF UNITS= Arithmetic mean is computed by dividing the SUM OF UNITS by the number of columns on the X-axis that actually contain data to be plotted.

Job Control Statements

This section describes the JCL statements required to execute the PRSPLT00 program. Figure 8-3 on page 8-7 provides a JCL example.

Table 8-2 PRSPLT00 JCL Statements

Statement	Function
JOB	Initiates the job.
EXEC	Specifies the program name of the plot analysis process as PGM=PRSPLT00 Also specifies the region required. The region requirement can be affected by • block size of the IRUF • number of buffers specified for the data sets • plot processors invoked
STEPLIB DD	Defines the program library (IMF.LOAD) that contains the PRSPLT00 program load module.
DATA DD	Defines the IRUF used as the input to the analysis. The data set DCB attributes are RECFM=VBS,LRECL=30970,BLKSIZE=30974.
SYSPRINT DD	Defines the print data set to contain a trace of the specified report control statements and control statement diagnostic messages. The DCB attributes must be specified explicitly. The characteristics of the data set are RECFM=F,LRECL=132. BLKSIZE must be specified explicitly.
PLOT DD	Defines the print data set to contain the formatted plot output. The DCB attributes must be specified explicitly. The characteristics of the data set are RECFM=FBA,LRECL=133,BLKSIZE=1330.
DUMP DD	Defines the print data set to contain an indicative dump when a program check is encountered, which is the result of LET control statement processing. The DCB attributes must be specified explicitly. The characteristics of the data set are RECFM=F,LRECL=132,BLKSIZE=132.
SYSIN DD	Defines user-specified control statements. The DCB attributes must be specified explicitly if the DSN parameter is used to define the data set.

Figure 8-3 provides an example of JCL for PRSPLT00.

Figure 8-3 Sample JCL for PRSPLT00

```
//JOBNAME  JOB  ............
//STEP1    EXEC PGM=PRSPLT00,REGION=128K
//STEPLIB  DD   DSN=IMF.LOAD,DISP=SHR
//DATA     DD   DSN=IRUF.MONTHS,DISP=SHR,
//              DCB=(RECFM=VBS,LRECL=30970,BLKSIZE=30974)
//SYSPRINT DD   SYSOUT=A,DCB=(RECFM=F,LRECL=132,BLKSIZE=132)
//PLOT     DD   SYSOUT=A,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=1330)
//DUMP     DD   SYSOUT=A,DCB=(RECFM=F,LRECL=132,BLKSIZE=132)
//SYSIN    DD   *
YAXIS=(LINES=100,ORIGIN=MIN)
XAXIS=(TIME=9/12.33,INTERVAL=200)
REPORT=TR,SELECT=ALL
REPORT=(PE,TE,PS,'NEW TITLE')
SELECT=ALL
SELECT=MSGREGION=(MREG001,MREG002,MREG003)
REPORT=DR
SELECT=DATABASE=PAY000
//
```

Plot Keyword Control Statements

Plot generation is controlled by user-supplied keyword control statements. The REPORT statement requests a plot, SELECT specifies the resources to be plotted, and XAXIS and YAXIS define the coordinate measurements.

The following sections describes the plot keyword control statements that are supplied by the user.

REPORT=

Determines the plots to be generated. A user-defined title can be specified. (For more information, see “REPORT Control Statement” on page 8-13.)

Parameter:

Two-byte plot code and optional title (pc,‘title’)

XAXIS=

Determines the date and time ranges and the format of X-axis data. The XAXIS statement must precede a SELECT statement. (For more information, see “XAXIS Control Statement” on page 8-15.)

Parameters:

DATE=yyddd/yyddd (00000/99365 is the default)
TIME=hh.tt/hh.tt (00.00/23.99 is the default)
INTERVAL=value from 0 to 999 (96 is the default)
SYSTEM=id (ALL is the default)
REGNTYPE=type (MPP is the default)

YAXIS=

Determines the format of Y-axis data. The YAXIS statement must precede a SELECT statement. (For more information, see “YAXIS Control Statement” on page 8-17.)

Parameters:

SCALE=value greater than or equal to 5 (MAX is the default)
LINES=value greater than 0 (50 is the default)
ORIGIN=value equal to or greater than 0 or MIN (default is 0)

SELECT=

Selects data for a plot, one for each request currently on the report queue. (For more information, see “SELECT Control Statement” on page 8-18.)

Parameters:

DATABASE=(list)|
MSGREGION=(list)|
LTERM=(list)|
TRANCODE=(list)|
RTCODE=(list)|
ALL

LET

Allows an indicative dump to be printed in //DUMP DD and inhibits abnormal termination of the reporting process when a program check is encountered.

Plot Options

Table 8-3 describes the plots that are available through the Graphical Analysis Facility. The first column contains the default title and a description of each plot. The second column is the two-character code used to request the plot in a REPORT control statement. The third column is a data type key that describes the storage and selection (see "SELECT Control Statement" on page 8-18) of IMS resource data in the IRUF, as follows:

Data Type	IRUF Record
T	Transaction accounting record data Selectable by TRANCODE, MSGREGION, LTERM
F	Fast Path transaction accounting record data Selectable by RTCODE, TRANCODE, MSGREGION, LTERM
P	Program accounting record data Selectable by MSGREGION only
D	Database segment, transaction accounting record data Selectable by DATABASE, TRANCODE, MSGREGION, LTERM

Table 8-3 Plotting Options (Part 1 of 4)

Title and Description	Code	Key
% DB2 CPU DB2 CPU percentage. The amount of time attributed to DB2 processing, expressed as a percentage of the total transaction CPU time. This value is the DB2 portion of the total CPU collected in the transaction accounting record only.	PD	T
Average SQL Calls per DB2 Transaction Average SQL calls. The average number of SQL calls issued by each transaction that accessed a DB2 subsystem.	AQ	D
Average Transaction Input Queue Time in Seconds Average input queue time. For message switches, the time is measured from the arrival of the original transaction from the terminal. For more information, see "Avg Trans Input Queue Time In Secs (Response Option)" below.	TQ	T
Avg Trans Input Queue Time in Secs (Response Option) Average time a transaction waited in the input queue for processing. This value differs from TQ only for message switches, where it is measured from the arrival of the message switch transaction on the queue. For DBCTL threads and TPI, this field is zero.	NQ	T
Average Transaction Response Time in Seconds Average response time, defined as input queue time (as in TQ) plus transaction elapsed time (ET). This value is valid for all transactions, not just those that respond to the originating terminal. For more information, see "Avg Trans Response Time in Secs (Response Option)" below. For DBCTL threads and TPI, only the elapsed time is reported.	TR	T

Table 8-3 Plotting Options (Part 2 of 4)

Title and Description	Code	Key
Avg Trans Response Time in Secs (Response Option) Average response time is the time from arrival on the input queue of the transaction from the originating LTERM to the first attempt to transmit an output message back to that LTERM. Non-response transactions are not measured. For DBCTL threads and TPI, this field is zero.	NR	T
Buffer Handling Processor (CPU) Time in Seconds Sum of message and control region Buffer CPU. For more information, see “Message Buffer CPU” on page 2-8 and “Control Buffer CPU” on page 2-9.	BP	T
Core Allocation (in K-Core Hours) Amount of allocated K-core minutes is calculated as `Program Elapsed Time in Minutes × Core Allocated`	CA	P
Core Utilization (in K-Core Hours) Amount of allocated K-core minutes is calculated as `Program Elapsed Time in Minutes × Core Used` For DBCTL threads, this field is zero.	CU	P
DB2 Processor (CPU) Time in Seconds Amount of CPU time used in the dependent region to process DB2 requests. For more information, see “DB2 CPU” on page 2-8.	EC	T
DL1 ’NO’ Input/Output Count Number of NO I/Os is defined as calls to the IMS buffer handler during database call processing that did not result in an I/O. For more information, see “NO I/O” on page 2-13.	DN	D
DL1 Processor (CPU) Time in Seconds Amount of DL/I CPU, both message and control region. For more information, see “Message DL/I CPU” on page 2-7 and “Control DL/I CPU” on page 2-8.	DP	T
DL1 Requests Number of DL/I database calls: GU + GN + ISRT + DLET + REPL.	DR	D
Elapsed Time per Access Method Request in 1/100 Secs The elapsed time for a transaction is calculated as `(Transaction Elapsed Time – Transaction CPU Time) ÷ Total Number of Database I/Os Measured for that Transaction` CPU time includes all CPU values in the transaction record (incurred during transaction execution), application program, DL/I, buffer handler and open/close CPU (both message and control region). I/Os include key and nonkey reads and writes.	AW	T
Fast Path Buffers Used Number of Fast Path buffers used.	BU	F
Fast Path Buffer Waits Number of Fast Path buffer waits.	BW	F

Table 8-3 Plotting Options (Part 3 of 4)

Title and Description	Code	Key
Fast Path CI Contentions Number of Fast Path CI contentions.	CC	F
Fast Path Overflow Buffer Latch Waits Number of Fast Path overflow buffer latch waits.	OW	F
Fast Path SYNC Point Failures Number of Fast Path sync point failures.	SF	F
Key Database I/O Amount of database key I/O, both reads and writes. For more information, see “Database Reads” on page 2-12 and “Database Writes” on page 2-13.	PI	D
Message Region Processor (CPU) Time in Seconds Amount of dependent region CPU: application program, message DL/I, message buffer, and DB2 CPU from the transaction record, plus message region overhead CPU from the program record if SELECT=ALL or MSGREGION. For more information, see “Application Program CPU” and “Message DL/I CPU” on page 2-7, “Message Buffer CPU” on page 2-8, and “Message Region Overhead CPU” on page 2-10.	MP	T,P
Message Transfer (Input/Output) Character Count Number of characters input from and output to the originating LTERM. This value is the internal IMS message character counts, after MFS on input, before MFS on output. For DBCTL threads and TPI, this field is zero.	MT	T
Nonkey Database I/O Amount of database nonkey I/O, both reads and writes. For more information, see “Database Reads” on page 2-12 and “Database Writes” on page 2-13.	SI	D
Number of SQL Calls Total number of all SQL calls issued by the transactions.	ER	D
Open/Close Processor (CPU) Time in Milliseconds Amount of open/close CPU in both message and control regions. For more information, see “Message OPEN/CLOSE CPU” on page 2-9 and “Control OPEN/CLOSE CPU” on page 2-9.	OP	T
Program Processing Elapsed Time in Seconds Amount of program elapsed time.	EP	P
Program Scheduling Time in Seconds Amount of program scheduling CPU in the control/DLISAS regions. For more information, see “Program Scheduling CPU” on page 2-10.	PS	P
Programs Executed Number of programs executed.	PE	P
Q Time as Percent of Response Time (Response Option) Ratio of input queue time (NQ) to response time (NR). Only response transactions are measured. For DBCTL threads and TPI, this field is zero.	NX	T

Table 8-3 Plotting Options (Part 4 of 4)

Title and Description	Code	Key
Queue Time as Percentage of Response Time Ratio of input queue time (TQ) to response time (TR) for all selected transactions. For DBCTL threads and TPI, this field is zero.	QR	T
System Abends Number of application program system abends (abend code S*xxx*).	SA	P
Total Billable Charges Amount of total billable charges.	XB	T
Total CPU Usage for all IMS Regions in Seconds Amount of total IMS CPU. This value includes both chargeable and overhead CPU from all regions – message, control, DLISAS, and DB2.	TC	T,P
Transaction Processing Elapsed Time in Seconds Amount of transaction elapsed time.	ET	T
Transactions Executed Number of transactions processed.	TE	T
User Abends Number of application program user abends (abend code U*xxxx*).	UA	P

Control Statement Syntax

This section describes the syntax requirements for control statements.

Start each statement with a keyword.

```
keyword=parameter or keyword=parameter=subparameter
```

The statement must be written in uppercase. The keyword can be abbreviated to the first three characters. Unrecognized keywords or parameters are ignored; processing continues with the next recognizable statement or parameter.

Delimit multiple statements in one line with a comma.

```
keyword=parameter,keyword=parameter,keyword=parameter
```

The line must end by column 72. Columns 73 and 80 are used for record sequencing.

Delimit multiple parameters within a statement by a comma and enclose the parameters in parentheses.

```
keyword=(parameter,parameter,parameter)
```

Continue statements from one line to another by using a comma after a statement or parameter and putting the next keyword or parameter on the subsequent line.

```
keyword=(parameter,parameter,parameter),
        keyword=(parameter,parameter),keyword=parameter
```

The continuation can begin anywhere in columns 1 to 72.

Use one or more blank characters after a statements to delimit a comment in the line. `keyword=parameter  PLOT DLI REQUESTS`
Enclose literal data in single quotation marks and include the data with the keyword parameters as a parenthesized parameter list. To use a single quotation mark as literal data, write it as two single quotation marks. `keyword=(parameter,'DLI ''NO'' INPUT/OUTPUT COUNT')`

REPORT Control Statement

The REPORT control statement determines the plot (or plots) to be requested for selected IRUF data. You can request multiple plots with a single REPORT control statement.

A REPORT statement requires a SELECT statement. The SELECT statement identifies the IRUF data to be plotted and produces the plot as specified by the keywords between REPORT and SELECT. To produce a plot, at least one REPORT and one SELECT control statement must be entered per PRSPLT00 execution.

REPORT=*pc*[(,*pc*...|'*title*')]

The title is a user-defined name (from 1 to 255 characters) that is enclosed in single quotation marks immediately following the report code parameter. The pc value is one or more of the two-byte plot codes shown in Table 8-4. (Table 8-3 on page 8-9 provides a description of the types of plots).

Table 8-4 Codes for Graphical Plot Reports (Part 1 of 2)

Plot Code	Plot Title
AQ	Average SQL Calls per DB2 Transaction
AW	Elapsed Time per Access Method Request in 1/100 Secs
BP	Buffer Handling Processor (CPU) Time in Seconds
BU	Fast Path Buffers Used
BW	Fast Path Buffer Waits
CA	Core Allocation (in K-Core Hours)
CC	Fast Path CI Contentions
CU	Core Utilization (in K-Core Hours)
DN	DL1 'NO' Input/Output Count
DP	DL1 Processor (CPU) Time in Seconds
DR	DL1 Requests
EC	DB2 Processor (CPU) Time in Seconds

Table 8-4 Codes for Graphical Plot Reports (Part 2 of 2)

Plot Code	Plot Title
EP	Program Processing Elapsed Time in Seconds
ER	Number of SQL Calls
ET	Transaction Processing Elapsed Time in Seconds
MP	Message Region Processor (CPU) Time in Seconds
MT	Message Transfer (Input/Output) Character Count
NQ	Avg Trans Input Queue Time in Secs (Response Option)
NR	Avg Trans Response Time in Secs (Response Option)
NX	Q Time as Percent of Response Time (Response Option)
OP	Open/Close Processor (CPU) Time in Milliseconds
OW	Fast Path Overflow Buffer Latch Waits
PD	DB2 CPU Percentage
PE	Programs Executed
PI	Key Database I/O
PS	Program Scheduling Time in Seconds
QR	Queue Time as Percentage of Response Time
SA	System Abends
SI	Nonkey Database I/O
SF	Fast Path Sync Point Failures
TC	Total CPU Usage for all IMS Regions in Seconds
TE	Transactions Executed
TR	Average Transaction Response Time in Seconds
TQ	Average Transaction Input Queue Time in Seconds
UA	User Abends
XB	Total Billable Charges

XAXIS Control Statement

The XAXIS control statement selects records from the IRUF file and defines the X-axis. XAXIS statements must precede any SELECT statement. The XAXIS statements define the records to be used for a plot request. DATE and TIME parameters request record selection by date and time and specify the X-axis units of measurement to be in days or hours.

The order of the parameters in the XAXIS statement determines the XAXIS span. If DATE is before TIME, the X-axis range is in days. If TIME is before DATE, the X-axis range is in hours. If no DATE or TIME is specified, the default for the X-axis measurement is TIME. INTERVAL defines the length of the X-axis. SYSTEM and REGNTYPE are global selections.

```
XAXIS=[(DATE=00000/99365|TIME=00.00/23.99,INTERVAL=96,
      SYSTEM=ALL,REGNTYPE=MPP)]
```

DATE Requests IRUF record selection by day or range of days. If DATE is specified before TIME, the X-axis measurement is set to the defined days. A range is defined by a slash sign (/) between two integers. The integer can be a value from 00000 to 99365. One day's activity is reported if only one integer is specified, such as DATE=yy055. If DATE is not specified, the default is 00000/99365 (all activity).

Note: The day plot can be produced from detail or daily summarized IRUFs. For example, an input of seven detail IRUFs from one week of processing can show the total week's activity by day for the seven-day input. A plot by DATE, showing the weeks in the year, could be produced from weekly summarized IRUFs.

TIME Requests IRUF record selection by hour or range of hours. If TIME is specified before DATE, the X-axis measurement is set to the defined hours. The range is defined by a slash (/) sign between two integers. The integer value defines hours and hundredths of hours. Hundredths of hours is optional. If only one integer is specified, such as TIME=2, the default is 2.00/2.99 (one hour of activity). If TIME is not specified, the default is 00.00/23.99 (all activity).

Note: The time plot can be produced only from detail IRUFs. If you try to produce a plot by TIME from a summarized IRUF, you will get a diagnostic code 03 (see "Diagnostic Codes" on page 8-20).

If the input IRUF contains more than 24 hours of data, some time intervals reflect more than one day's data. For example, if seven detail IRUFs from one week of processing are used as input, a plot by TIME could show the total week's activity by time slices, such as the hour from 10:00 A.M. to 11:00 A.M. for all seven days.

INTERVAL Specifies a numeric value from 0 to 999 that defines the X-axis length and unit increments. A maximum of 100 columns can be defined per page. If more than 100 columns is specified, multiple pages are produced. The default is 96.

If TIME is specified, the unit increments for each column are number of hours. This value is calculated by dividing the X-axis elapsed time (defined by DATE or TIME range) by the specified INTERVAL value.

For example, the TIME default of TIME=00.00/23.99 and the INTERVAL default of INTERVAL=96 produces a plot with 96 X-axis columns representing 15 minutes each (24 hours × 60 minutes ÷ 96). A plot request of DATE=yy001/yy091 with INTERVAL=91 defines each X-axis column as one day. If you change the request to INTERVAL=13, each X-axis column is defined as one week. For best results, the input summarization should match the desired granularity of the X-axis.

SYSTEM Specifies a single alphanumeric character for a specific IMS ID or the character string ALL for all IMS IDs. Transactions with system IDs that do not match the SYSTEM value will not be selected for plotting. The default is ALL.

REGNTYPE Specifies a region type. Only transactions or programs that executed in the specified region type will be plotted. The regions are specified as follows:

MPP	Regular (MPP and JMP), conversational (MPC), and Fast Path message-driven (MDP) transactions and programs only. Exclude batch message processing (BMP and JBP) and Fast Path utility (FPU) activity. (MPP is the default value.)
BMP	BMP, JBP, and FPU activity only.
ALL	All MPP, JMP, MPC, MDP, FPU, BMP and JBP activity.

YAXIS Control Statement

The YAXIS control statement defines the base, height, and scale of the Y-axis. YAXIS statements must precede any SELECT statement.

```
YAXIS=[(ORIGIN=0,SCALE=MAX,LINES=50)]
```

ORIGIN Specifies a numeric value equal to or greater than zero or the character string MIN. The value defines the base of the Y-axis. The default is zero. If MIN is specified, the plot program determines the actual minimum value for any X-axis column and uses that value as the base for the Y-axis, which may allow for better granularity in the Y-axis values.

If a value greater than zero is specified, all data to be plotted must be greater than or equal to the ORIGIN value or a message is printed and the base value reverts to zero.

SCALE Defines the units of measurement for the Y-axis. The parameter can be a numeric value equal to or greater than five or the character string MAX. MAX specifies dynamic generation of the scale value for the requested plot (or plots). The default is MAX. The scale value is printed at the top of the Y-axis.

LINES Specifies a numeric value greater than zero. The default is 50. The value defines the vertical length and unit increments of the Y-axis. The increments are calculated by dividing the SCALE value by the LINES value. If the value is greater than 50, two or more pages of plot output are produced.

SELECT Control Statement

The SELECT control statement specifies the IMS resource data to be plotted and generates the plot (or plots) as requested by the preceding REPORT, XAXIS, and YAXIS control statements. There is no default for the SELECT control statement. The statement must be entered to generate one or more plots.

Each SELECT statement creates a plot for a preceding REPORT statement. For example, three separate REPORT statements followed by two separate SELECT statements would produce six plots (see “Control Statement Examples” on page 8-19).

```
SELECT={ALL|
        TRANCODE=(id,...,*)|
        MSGREGION=(id,...,*)|
        LTERM=(id,...,*)|
        RTCODE=(id,...,*)|
        DATABASE=(id,...,*)}
```

ALL Selects all transactions that satisfy date, time, system, and region type requests specified by the XAXIS control statement.

TRANCODE Requests one or more transactions by name, where id is a 1- to 8-byte character string name. An asterisk requests the previous list of transaction names. TRANCODE cannot be used to select program record data.

MSREGION Requests one or more message regions by name, where id is a 1- to 8-byte character string name. An asterisk requests the previous list of region names. Program and transaction records can be plotted (see CA, CU, EP, PE, PS, SA, UA, MP, and TC in “Plot Options” on page 8-9).

LTERM Requests one or more LTERMs by name, where id is a 1- to 8-byte character string name. An asterisk requests the previous list of LTERM names. LTERM requests can be made against a detail IRUF only. This parameter cannot be used to select program record data.

RTCODE Requests one or more routing codes by name, where id is a 1- to 8-byte character string name. An asterisk requests the previous list of RTCODE names. Fast-Path-specific transaction data can be plotted (see BU, BW, CC, OW, and SF in “Plot Options” on page 8-9).

DATABASE Requests one or more DL/I databases or DB2 application plans by name, where id is a 1- to 8-byte character string name. An asterisk requests the previous list of database names. Only data within the database segments of the transaction record can be plotted (see AQ, ER, DN, DR, PI, and S in “Plot Options” on page 8-9).

Note: Database selection is not valid for REPORT=AW, because the wait-time calculations are done with transaction-level data.

Control Statement Examples

This section describes the use of the keyword control statements shown in Figure 8-3 on page 8-7. These statements request eight user-specified plots, as follows:

- YAXIS = (LINES = 100,ORIGIN = 0)

  The number of lines of the Y-axis is set to 100 (50 greater than the default of 50), and the base of the Y-axis will be zero for all subsequent plots.

- XAXIS = (TIME = 9/12.20,INTERVAL = 200)

  The TIME parameter defines the unit increments of the horizontal axis in hours and minutes. (If DATE was specified before TIME, the unit increments would be in number of days.) Data selection is by time, between 9:00 A.M. and 12:20 P.M. INTERVAL = 200 specifies an X-axis length of 200 columns. Since the selected time period is 200 minutes, each column represents one minute. This plot requires two pages, because only 100 columns can be shown per page of plot output.

- REPORT = TR , SELECT = ALL

  The first statement, REPORT = TR, requests a plot of average transaction response time. SELECT = ALL places that request on the plot request queue; no DATABASE or MSGREGION activity is selected.

- REPORT = (PE,TE, PS,'PROGRAM SCHEDULING')

  This REPORT statement deletes the current report queue and constructs a new queue of programs executed, number of transactions, and program scheduling time. The title for the time plot will be changed to PROGRAM SCHEDULING.

- SELECT = ALL

  SELECT = ALL generates three plots (PE,TE,PS) as requested by the second REPORT statement. The Y-axis of 100 lines and zero base value and X-axis of one-minute increments from 9 to 12.20 hours are the coordinates of these plots.

  Note: The first plot (TR) is not affected by the new coordinates, because the SELECT statement that produced the plot is on the same line as REPORT=TR.

- SELECT = MSGREGION = (MREG001, MREG002, MREG003)

  This SELECT statement produces three additional plots of PE, TE, and PS. This time, however, data selection is by MSGREGION IDs.

- REPORT = DR

  This statement deletes the previous report queue and constructs a new queue of DL/I requests.

- SELECT = DATABASE = PAY000

  This statement selects DL/I requests made only to database PAY000.

Note: There must be at least one SELECT statement in the control statement input stream to produce a plot.

Diagnostic Codes

The following messages and codes may be issued during PRSPLT00 verification of user-supplied control statements and execution of the plot requests.

Code	Explanation
0	All the control statements specified are shown. Code 0 represents normal processing.
1	Unrecognized keyword.
2	Unable to locate requested module.
3	Summarization period larger than plot interval specification (specify DATE as the first parameter).
4	Bad XAXIS specification.
5	Program interruption.
6	No plot, array empty, or selection criteria not applicable. **Note:** This return code is issued when no data could be collected to plot. The corresponding plot is not produced. This message may occur as a result of MVIMS data collection options. Refer to the descriptions of specific options in Chapter 2, “Event Collector Options.”
7	Numeric string not null or terminated with a delimiter.
8	Last select statement missing.
A	*Data overflow - decrease plot period - retry*

Figure 8-4 provides an example of a Graphical Analysis Facility Diagnostics report.

Figure 8-4 Graphical Analysis Facility Diagnostics

```
****IMF****            IMS PERFORMANCE REPORTER             ****IMF****

                 GRAPHICAL ANALYSIS FACILITY DIAGNOSTICS


    CODE      MESSAGE

          0 ->REPORT=(TC,PS,EP,BP,OP,MP,DP,ET)
          0 ->  YAXIS=SCALE=MAX
          0 ->    SELECT=ALL
          0 ->REPORT=(NX)
          0 ->  XAXIS=(DATE=yy001/yy365,TIME=07.00/19.00,INTERVAL=96)
          0 ->  YAXIS=SCALE=100
          0 ->    SELECT=ALL
          0 ->REPORT=(AQ,EC,ER,PD)
          0 ->  YAXIS=SCALE=MAX
          0 ->    SELECT=ALL
          0 ->    LET
EOFSYSN1  0 ->****COMMAND PROCESSING FUNCTIONS COMPLETED.
EOFAMF
```

Chapter 9 Transaction Response Reports (PRSRESP)

The transaction response reports are used to evaluate response time.

Objectives:

- Report response time, either in total or in separate component timings such as input queue, elapsed processing time, and output queue.
- Show the distribution of these timings in ranges with percentage and cumulative percentage.
- Account for special cases such as message switching or transactions that do not always make a response.
- Produce only the report sequences selected, at the level of detail required.

  The timings can be reported by transaction, logical terminal, program, line, class, routing code, security user ID, or customer ID.

Uses:

- Identify which transactions or classes of transactions are meeting their response objectives by analyzing the cumulative percentages completed in the distribution ranges, which can be variably defined to fit installation standards.
- Identify transactions with excessive response times and isolate where the time is being spent, such as in the queues, processing, or waiting for lines.
- Analyze the timings not only by transaction or class but also by logical terminal, line, program, routing code, security user ID, or customer ID to help identify problems or imbalances in these areas.

Input and Output

The IRUF input to this program must be created with the IMFLEDIT response option specified (see the Log Edit utility description in the *MAINVIEW for IMS Offline – Customization and Utilities Guide*).
If a summary of the IRUF is used, some of the timings, percentages, and counts per range may be skewed because of the nature of the summarization process in capturing the various times. This skewing of counts is due to the fact that averages from groups of activity are used instead of individual transaction records.

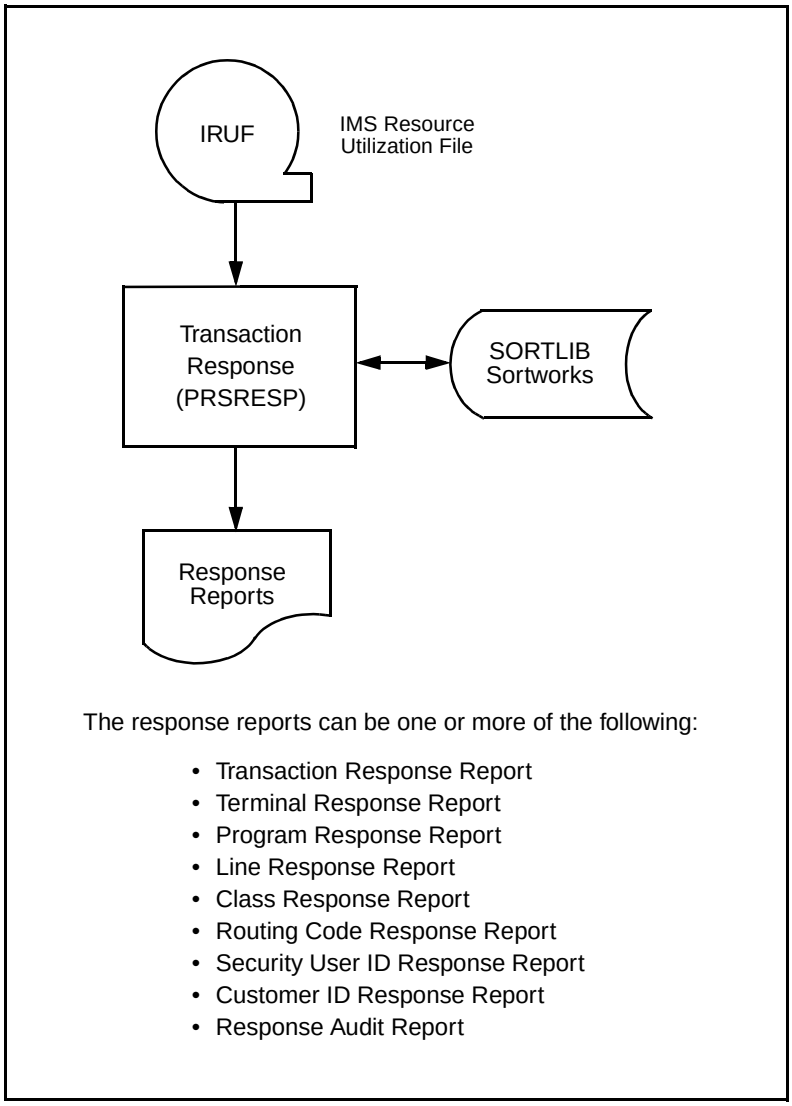
When a detail IRUF is input to PRSRESP, the event times for each transaction are in the transaction record and are used when transactions are accumulated into the response threshold categories for the response reports.

When a summary IRUF is input to PRSRESP, there is a single record with the accumulated total time and transaction count for a number of transactions. From this data, the average response for all transactions accounted for by that record can be calculated. All those transactions are then placed into the same category in the response report. (Total elapsed time divided by the number of transactions equals the average elapsed time. This formula is used for all of the response report time fields).

Because of the above processing, transactions from a detail IRUF that fall under different response thresholds, and are therefore reported in different response categories in the report, will all be reported under the same threshold when a summary IRUF is used for the same set of transactions. In addition, if some times were excluded from the averages on the detail reports because they fell into the category reported in the OVER field, those times may be included in the averages when a summary IRUF is used.

Figure 9-1 on page 9-3 shows PRSRESP system flow.

Figure 9-1 PRSRESP System Flow



The response reports can be one or more of the following:

- Transaction Response Report
- Terminal Response Report
- Program Response Report
- Line Response Report
- Class Response Report
- Routing Code Response Report
- Security User ID Response Report
- Customer ID Response Report
- Response Audit Report

Report Element Descriptions

This section describes each element of the transaction response reports produced by PRSRESP.

DBCTL Threads:

DBCTL CICS and ODBA thread activity can be reported by PRSRESP. The following considerations apply:

- CICS=YES or CICS=OFFLINE must be specified for the Event Collector in BBPARM member IMFECP00.
- DBCTL threads have only elapsed time values for this report.

Figure 9-2 provides an example of the Transaction Response Report.

Figure 9-2 Transaction Response Report

```
**** IMF ****                                IMS PERFORMANCE REPORTER                                          **** IMF ****
CURRENT DATE - 03/22/yy <1>                TRANSACTION RESPONSE REPORT <2>                                  PAGE NO.    1
REPORTING RANGE REQUESTED yy.350 00.01 TO yy.350 23.59 <3>          <4> ACTUAL REPORTING RANGE FOUND yy.350 05.41 TO yy.350 05.43
*************************************************************************************************************************

TRANCODE LTERM <5>      TOTAL    AVG. SECS     RANGES IN SECONDS (UPPER LIMITS)
                      ACCOUNTED  (W/O OVER)  <10> .5     1.0     2.0     4.0     8.0    10.0    20.0    OVER
      <6>                <7>
ABCIT02  BMC013              33
    <13> RESPONSE            16  <9> 0.82   <10-1> 4       9       2       1       0       0       0       0
    <11> **MSG SWS           16         <10-2> 25.0%   56.2%   12.5%    6.2%    0.0%    0.0%    0.0%    0.0%
    <12> **MSG SW AVG LEVEL   1         <10-3> 25.0%   81.2%   93.7%  100.0%  100.0%  100.0%  100.0%  100.0%
    <14> INPUT Q             33      0.20          31       0       1       1       0       0       0       0
                            <8>                93.9%    0.0%    3.0%    3.0%    0.0%    0.0%    0.0%    0.0%
                                               93.9%   93.9%   96.9%  100.0%  100.0%  100.0%  100.0%  100.0%
    <15> ELAPSED             33      0.33          32       1       0       0       0       0       0       0
                                               96.9%    3.0%    0.0%    0.0%    0.0%    0.0%    0.0%    0.0%
                                               99.3%  100.0%  100.0%  100.0%  100.0%  100.0%  100.0%  100.0%
    <16> RESP TO DEQ         16      4.26           0       0       0      10       6       0       0       0
                                                0.0%    0.0%    0.0%   62.5%   37.5%    0.0%    0.0%    0.0%
                                                0.0%    0.0%    0.0%   62.5%  100.0%  100.0%  100.0%  100.0%
    <17> OUTPUT Q            16      0.01          16       0       0       0       0       0       0       0
                                              100.0%    0.0%    0.0%    0.0%    0.0%    0.0%    0.0%    0.0%
                                              100.0%  100.0%  100.0%  100.0%  100.0%  100.0%  100.0%  100.0%
    <18> DEQUEUE             16      3.44           0       0       0      16       0       0       0       0
                                                0.0%    0.0%    0.0%  100.0%    0.0%    0.0%    0.0%    0.0%
                                                0.0%    0.0%    0.0%  100.0%  100.0%  100.0%  100.0%  100.0%
    <19> OUT TO DEQ          16      3.45           0       0       0      16       0       0       0       0
                                                0.0%    0.0%    0.0%  100.0%    0.0%    0.0%    0.0%    0.0%
                                                0.0%    0.0%    0.0%  100.0%  100.0%  100.0%  100.0%  100.0%
    <20> ARIV-START          33      0.43          28       1       2       2       0       0       0       0
         **MSG SWS           16                84.8%    3.0%    6.0%  100.0%    0.0%    0.0%    0.0%    0.0%
         **MSG SW AVG LEVEL   1                84.8%   87.8%   93.9%  100.0%  100.0%  100.0%  100.0%  100.0%
    <21> ARIV-STOP           33      0.76          14      14       3       2       0       0       0       0
         **MSG SWS           16                42.4%    3.0%    9.0%    6.0%    0.0%    0.0%    0.0%    0.0%
         **MSG SW AVG LEVEL   1                42.4%   84.8%   93.9%  100.0%  100.0%  100.0%  100.0%  100.0%
```

Table 9-1 describes Transaction Response Report elements. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 9-1 Transaction Response Report Elements (Part 1 of 4)

<1> CURRENT DATE

Date this report was generated, in mm/dd/yy format.

<2> title

Title that identifies the type of report.

<3> REPORTING RANGE REQUESTED

Time range requested for this response report. This range is the same as the range specified with the PARM option in the EXEC statement. If the time range selection was not specified, this range is set to equal the ACTUAL REPORTING RANGE FOUND.

The range is expressed as the lowest date (yy.ddd) and time (hh.mm) requested through the highest date (yy.ddd) and time (hh.mm) requested.

<4> ACTUAL REPORTING RANGE FOUND

Time range encountered for this response report. This range is expressed as the lowest date (yy.ddd) and time (hh.mm) found in the data selected for reporting through the highest date (yy.ddd) and time (hh.mm) found in the data selected.

<5> TRANCODE LTERM

Major (total) and minor (subtotal) control break fields for Transaction Response reports. Other control break fields are as follows:

Report:	Major:	Minor:
TRANSACTION	TRANCODE	LTERM
TERMINAL	LTERM	TRANCODE
PROGRAM	PROGRAM	TRANCODE
LINE	LINE	PTERM
CLASS	CLASS	TRANCODE
RTCODE	RTCODE	TRANCODE
SECURITY	USERID	TRANCODE
CUSTOMER	CUSTOMERID	TRANCODE

Table 9-1 Transaction Response Report Elements (Part 2 of 4)

<6> control break fields

Major and minor control break fields are shown at each change. Minor control break lines can be suppressed. Consequently, the minor field displays the word TOTAL (which corresponds to the major reporting level chosen). The sum of all totals for a report type is shown as FINAL TOTALS.

TRANCODE	Name of the transaction being reported.
LTERM	Logical terminal name of the terminal used to submit the transaction.
PROGRAM	PSB name of the program that processed the transaction.
LINE	Physical line number of the line used to submit the transaction (see note below).
PTERM	Physical terminal number of the terminal used to submit the transaction (see note below).

Note: The line and physical terminal numbers are picked up from the output response message records. They are not available for transactions that did not respond to the originating terminal. This fact has an effect only in the Line Response report, where nonresponse transactions appear under line 0000.

CLASS	Processing class used to assign the transaction to a message region.
RTCODE	Name of the routing code being reported.
USERID	IMS signon ID.
CUSTOMER ID	User-specific identification. The default value is LTERM.

The reporting of items 7 through 12 is in response to user-selected timings (see “Selecting Reports and Timings” on page 9-17) that are also reported (see report element descriptions 13 through 21). The following values appear for each selected timing.

<7> TOTAL ACCOUNTED

Total number of transaction records processed within this reporting level.

<8> TOTAL ACCOUNTED (with valid timing)

Number of transaction records processed within this reporting level that had a valid timing of this type. For example, if a transaction made no response to the originating terminal, the transaction would not be included in the response count, nor would it be used to calculate the average and cumulative range percentages. This transaction would, however, appear in the input queue and elapsed time counts.

If no transactions within the reporting level had a requested timing (RESPONSE), that timing is not printed.

<9> AVG. SECS (W/O OVER)

Average number of seconds calculated for this timing. Total accumulated seconds divided by the total accounted for this timing, excluding any values in the last range.

If all values for this timing fall in the last range, the average is not calculated and this field is blank.

<10> RANGES IN SECONDS (UPPER LIMITS)

Upper limit of each range in the distribution is shown in tenths of a second, as specified by the RSRANG control statement (see “Specifying Time Ranges” on page 9-16). A maximum of eleven ranges can be reported. The last range contains any values that exceed the last upper limit defined.

Within each range, the following fields are shown for each timing requested for that report type, at each reporting level (control break):

1. Number of transaction records whose value for that timing fell in this range.
2. Percentage that the number of transaction records within this range represents of the total accumulated for that timing (TOTAL ACCOUNTED).
3. Cumulative percentage within the ranges from left to right.

Table 9-1 Transaction Response Report Elements (Part 3 of 4)

<11> **MSG SWS Number of transactions that were message switches (reported only with the ARIV START and ARIV STOP timings). Number of transactions that made a response that was a message switch. (Reported only with the RESPONSE timing.)
<12> **MSG SW AVG LEVEL Average level of message switching to reach this transaction. For example, a value of 1 indicates that the program processing the originating transaction from the terminal created this transaction as a message switch. A value of 2 indicates that another program was also invoked. (Reported only with the RESPONSE, ARIV START, or ARIV STOP timings.)
The reporting of items 13 through 21 below depends on the timings selected (see “Control Statement Timing Selection Codes” on page 9-20).
<13> RESPONSE Arrival time to message sent time. For message switches, the arrival time of the original input transaction is used. You can set a parameter in IMFLEP00 to limit this time to a maximum value (see the *MAINVIEW for IMS Offline – Customization and Utilities Guide*). For DBCTL threads and TPI, this field is zero.
<14> INPUT Q Arrival time to start time. For message switches, the enqueue time of the message switch transaction is used. You can set a parameter in IMFLEP00 to limit this time to a maximum value (see the *MAINVIEW for IMS Offline – Customization and Utilities Guide*). For DBCTL threads and TPI, this field is zero.
<15> ELAPSED Start time to stop time.
<16> RSP TO DEQ Arrival time to message dequeue time. For message switches, the arrival time of the original input transaction is used. For DBCTL threads and TPI, this field is zero.
<17> OUTPUT Q Message insert time to message sent time. For DBCTL threads and TPI, this field is zero.
<18> DEQUEUE Message sent time to message dequeue time.
<19> OUT TO DEQ Message insert time to message dequeue time. For DBCTL threads and TPI, this field is zero.

Table 9-1 Transaction Response Report Elements (Part 4 of 4)

<20> ARIV-START	Arrival time to start time. For message switches, the arrival time of the original input transaction is used (original MVIMS input queue time definition). You can set a parameter in IMFLEP00 to limit this time to a maximum value (see the *MAINVIEW for IMS Offline – Customization and Utilities Guide*). For DBCTL threads and TPI, this field is zero.
<21> ARIV-STOP	Arrival time to stop time. For message switches, the arrival time of the original input transaction is used (original MVIMS response time definition).

IRUF Collection of IMS Elapsed Processing Timings

MVIMS uses up to nine user-selectable timings (see “Selecting Reports and Timings” on page 9-17) to define elapsed processing times in the life of an IMS transaction. As shown in Figure 9-2 on page 9-4, Performance Reporter response reports use all nine timings; other types of Performance Reporter reports use only some of the timings.

All timings are available when the response option is requested during MVIMS Log Edit (see the Log Edit chapter in the *MAINVIEW for IMS Offline – Customization and Utilities Guide*). If the Log Edit response option is not specified, however, only the ELAPSED, ARIV START, and ARIV STOP timings are available per transaction.

Response-related elapsed timings (RESPONSE, RSP TO DEQ, OUTPUT Q, DEQUEUE, OUT TO DEQ) are captured only for transactions that respond to the originating terminal and are defined as recoverable to IMS.

MVIMS Definition of IMS Elapsed Processing Time

In a detail IRUF, the timestamps and elapsed timings define the life of a single transaction. In a summarized IRUF, the timestamps are bounds (earliest arrival or start time to latest dequeue or stop time), and the elapsed timings are calculated by dividing the totals by the total number of transactions. In the case of response times, these values are calculated by dividing the totals by the total number of response transactions.

The nine timings provided by MVIMS to define elapsed processing times in the life of an IMS transaction are shown in Table 9-2.

Table 9-2 Timing Definitions

Timing	Definition
RESPONSE	Arrival Time to Message Sent Time For message switches, the arrival time of the original input transaction is used.
INPUT Q	Arrival Time to Start Time For message switches, enqueue time is used. The enqueue time depends on the setting of the IMFLEP00 parameter MSGSWIQT. If MSGSWIQT=NO (the default), the input queue time of the originating message is used. If MSGSWIQT=YES, the input queue time of the most recent message switch is used, in other words, the time the message is enqueued to the scheduler message block (SMB).
ELAPSED	Start Time to Stop Time
RSP TO DEQ	Arrival Time to Message Dequeue Time For message switches, the arrival time of the original input transaction is used.
OUTPUT Q	Message Insert Time to Message Sent Time OUTPUT Q is measured by MVIMS as starting at message insert time, not at transaction stop time. For that reason, RESPONSE is *not* equal to ARIV START plus ELAPSED plus OUTPUT Q.
DEQUEUE	Message Sent Time to Message Dequeue Time
OUT TO DEQ	Message Insert Time to Message Dequeue Time
ARIV START	Arrival Time to Start Time For message switches, the arrival time of the original input transaction is used (original MVIMS input queue time definition).
ARIV STOP	Arrival Time to Stop Time For message switches, the arrival time of the original input transaction is used (original MVIMS response time definition).

MVIMS Calculation of IMS Elapsed Processing Time

The user-selected timings are calculated with the timestamp definitions in Table 9-3.

Table 9-3 Timestamp Definitions

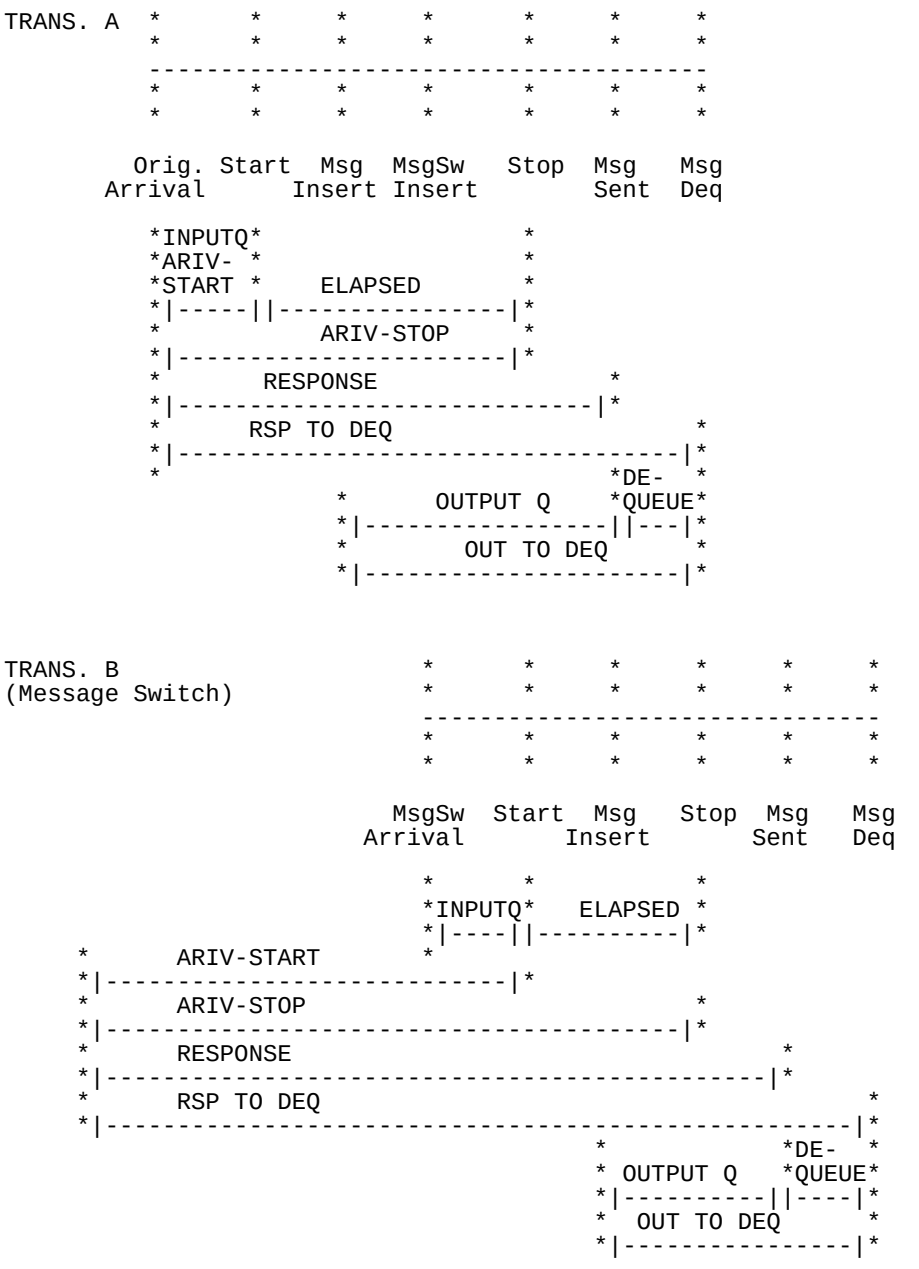
Timestamp	Definition
Arrival Time	Arrival time of the transaction. For full function transactions, the arrival time is taken from the X'03' log record, which contains the time the message arrived on the message queue. For Fast Path transactions, the arrival time is taken from the X'FA' record. For message switches, the arrival time of both the message switch transaction and the original input transaction are available.
Start Time	Start of transaction processing. The X'FA' record contains the start time for all types of transactions – full function, Fast Path, message switches, and multiple systems coupling (MSC).
Message Insert Time	Enqueue of a (first) response to the originating terminal (X'35').
Stop Time	End of transaction processing. The X'FA' record contains the stop time for all types of transactions—full function, Fast Path, message switches, and MSC.
Message Sent Time	First attempt to transmit response. (communications get unique, X'31'). For Fast Path, the 5936 log record is used. If this time exceeds the maximum specified by the Log Edit parameter in BBPARM member IMFLEP00, collection stops and the maximum is assigned (see the Log Edit Input Parameters section in the Log Edit chapter of the *MAINVIEW for IMS Offline – Customization and Utilities Guide*).
Message Dequeue Time	Dequeue of the response message (transmission time completed, X'36'). For Fast Path, the 5936 log record is used. If this time exceeds the maximum specified by the MVIMS Log Edit parameter in BBPARM member IMFLEP00, collection stops and the maximum is assigned (see the Log Edit Input Parameters section in the Log Edit chapter of the *MAINVIEW for IMS Offline – Customization and Utilities Guide*).

Note: A special case concerning elapsed times can occur with some applications, especially with BMPs or JBPs. MVIMS defines transaction elapsed time as the amount of time that elapses between one MESSAGE GET UNIQUE and the next MESSAGE GET UNIQUE. If a program continues processing after the final MESSAGE GET UNIQUE that received a QC status code (no more transactions), the resources used during that processing are charged to the last transaction.

This situation could result in a transaction with a very short elapsed time showing very high resource usage. Such a transaction could cause warning messages to be produced during the Log Edit process if the accumulated CPU time exceeds the transaction elapsed time. The program elapsed time continues through program end.

Figure 9-3 on page 9-12 shows elapsed time examples for a terminal-entered transaction (transaction A) and for a message-switch transaction (transaction B).

Figure 9-3 Timing Examples



Job Control Statements

This section describes the JCL required to execute the PRSRESP program. Figure 9-4 on page 9-14 provides a JCL example.

Table 9-4 PRSRESP JCL Statements

Statement	Function
JOB	Initiates the job.
EXEC	Specifies the program name of the response report process as PGM=PRSRESP Also specifies the region and the PARM parameters required to define a time period, system ID, an internal sort size, and response times (see “PARM Options in the EXEC Statement” on page 9-14). The region requirement can be affected by •block size of the IRUF •number of buffers specified for the data sets •internal sort size requirements
STEPLIB DD	Defines the program library (IMF.LOAD) that contains the PRSRESP program load module.
RESUTIL DD	Defines the detail or summarized IRUF used as input to the program. The data set DCB attributes are RECFM=VBS,LRECL=30970,BLKSIZE=30974.
RSPLIST DD	Defines the print data set to contain the Response Audit report and the Response Selection Trace report. The characteristics of the data set are RECFM=FB,LRECL=133. BLKSIZE must be specified explicitly.
RSPSELEC DD	Defines report control statements, which are described on page 9-16. If the DSN parameter is used to define the data set, the data set characteristics are RECFM=FB,LRECL=80.
SORTLIB DD	Defines the library for the modules loaded by an internally invoked sort program.
SYSOUT DD	Defines the output class.
SORTWK*nn* DD	Defines work data sets for data sorting; *nn* is a numeric.

Figure 9-4 provides an example of JCL for PRSRESP.

Figure 9-4 Sample JCL for PRSRESP

```
//JOBNAME  JOB  ..............
//STEP1    EXEC PGM=PRSRESP,REGION=192K,
//              PARM='95010,0800,95010,1600,*,090000'
//STEPLIB  DD   DSN=IMF.LOAD,DISP=SHR
//RESUTIL  DD   DSN=IRUF.MONTHS,DISP=SHR,
//              DCB=(RECFM=VBS,LRECL=30970,BLKSIZE=30974)
//RSPLIST  DD   SYSOUT=A,DCB=BLKSIZE=133
//RSPSELEC DD   *
RSRANG,000005,000010,000030,000050,000080,000100
RSTRAN,Y,RSP
RSCLAS,Y,INQ,ELP,RSP
/*
//SORTLIB  DD   DSN=SYS1.SORTLIB,DISP=SHR
//SYSOUT   DD   SYSOUT=A
//SORTWK01 DD   UNIT=SYSDA,SPACE=(CYL,(20))
//SORTWK02 DD   UNIT=SYSDA,SPACE=(CYL,(20))
//SORTWK03 DD   UNIT=SYSDA,SPACE=(CYL,(20))
//
```

PARM Options in the EXEC Statement

The PRSRESP EXEC statement PARM options can be used to define

- time period selection
- system ID selection
- sort size for the internal sort

Time Period Selection

This option defines the range of time to be selected for this reporting process. The range is specified as the lowest Julian date (yyddd) and time (hhmm) to the highest Julian date (yyddd) and time (hhmm).

PARM Positions	Options
01 – 21	ldate,ltme,hdate,htme ldate Low Julian date in yyddd format. ltme Low hour/minute in hhmm format. hdate High Julian date in yyddd format. htme High hour/minute in hhmm format.

The value 00000,0000,00000,0000 specifies that the time period selection is not to be invoked.

System ID Selection

This PARM option defines the computing system to be reported.

PARM Positions	Options
22 – 23	,x | ,* x System ID to be selected. * System ID selection is not to be invoked.

Sort Size for the Internal Sort

This option is a six-digit number that specifies the amount of storage for the internal sorting process (from 018000 bytes up to the maximum available main storage).

PARM Positions	Options
24 – 30	,nnnnnn | ,030000 nnnnnn Sort storage size. 030000 Sort storage size default of 30,000 bytes of storage.

PARM Options Example

The following example requests response reports on day 02.076 from 8:00 A.M. to 4:00 P.M. All system IDs (*) are to be selected. The storage size for the internal sort is to be 50,000 bytes.

```
PARM='02076,0800,02076,1600,*,050000'
```

Report Control Statements

Positional report control statements define time ranges, select a type of report, and specify the response times to be reported.

Specifying Time Ranges

From one to ten values can be entered to define upper limits of the time ranges for the response reports. The last range (11 or lower) is automatically set to include everything above the last upper limit specified. Any values falling in this last range are not used in the calculation of average times. Table 9-5 shows the syntax for specifying time ranges for PRSRESP.

Table 9-5 Report Statement Syntax – Distribution Range

Position	Input
01 – 02	Program code: RS
03 – 06	Statement code: RANG
07	Comma or blank
08 – 13	Upper limit of range 1 Format is *nnnnnn* which is interpreted in tenths of a second (with the maximum upper limit being 99999.9)
14	Comma or blank
15 – 20	Upper limit of range 2 (same format as upper limit of range 1)
21	Comma or blank
22 – 27	Upper limit of range 3 (same format as upper limit of range 1)
28	Comma or blank
29 – 34	Upper limit of range 4 (same format as upper limit of range 1)
35	Comma or blank
36 – 41	Upper limit of range 5 (same format as upper limit of range 1)
42	Comma or blank
43 – 48	Upper limit of range 6 (same format as upper limit of range 1)
49	Comma or blank
50 – 55	Upper limit of range 7 (same format as upper limit of range 1)
56	Comma or blank
57 – 62	Upper limit of range 8 (same format as upper limit of range 1)
63	Comma or blank
64 – 69	Upper limit of range 9 (same format as upper limit of range 1)
70	Comma or blank
71 – 76	Upper limit of range 10 (same format as upper limit of range 1)

With the option statement shown in Figure 9-4 on page 9-14, the distribution is as follows:

Range 1	0.0 – 0.5 seconds
Range 2	0.5 – 1.0 seconds
Range 3	1.0 – 3.0 seconds
Range 4	3.0 – 5.0 seconds
Range 5	5.0 – 8.0 seconds
Range 6	8.0 – 10.0 seconds
Range 7	over 10.0 seconds

If no RSRANG statement is entered, the following default values are used:

1, 2, 3, 4, 5, 8, 11, 14, 17, 20, and over 20 seconds.

Selecting Reports and Timings

Any or all of the six response reports can be selected in a single execution of the PRSRESP report program. No specific input sequence is required. Defaults take effect for any statement type not specified or fields not defined.

Each user-specified statement is printed on the Response Audit report, either with a message that the statement is accepted or with one or more error messages. If any error is found, the program terminates at the end of the statement analysis.

If multiple reports are requested, the report code (which is described in “Control Statement Report Codes” on page 9-19) determines the reporting sequence. The timing selection codes (which are described in “Control Statement Timing Selection Codes” on page 9-20) define the response time components to be reported.

Table 9-6 shows report control statement syntax for selecting reports and timings.

Table 9-6 Report Statement Syntax – Transaction Response

Position	Input
01 – 02	Program code: RS
03 – 06	Report code: TRAN | TERM | PROG | LINE | CLAS | ROUT | USER | CUST
07	Comma or blank
08	Subtotal flag: Y Print subtotals N Do not print subtotals
09	Comma or blank
10 – 12	Timing selection code field 1
13	Comma or blank
14 – 16	Timing selection code field 2
17	Comma or blank
18 – 20	Timing selection code field 3
21	Comma or blank
22 – 24	Timing selection code field 4
25	Comma or blank
26 – 28	Timing selection code field 5
29	Comma or blank
30 – 32	Timing selection code field 6
33	Comma or blank
34 – 36	Timing selection code field 7
37	Comma or blank
38 – 40	Timing selection code field 8
41	Comma or blank
42 – 44	Timing selection code field 9

Control Statement Report Codes

Table 9-7 shows the elements required to define response reports. The table shows the elements reported for each report code and the timing defaults for each report if no timing selection code is specified.

For example, the Transaction Response Report (selected by specifying TRAN in positions 3 through 6 of the control statement) provides response times by transaction code and associated LTERM name. The Program Response Report (selected with the PROG report code) provides response times by program name and associated transaction code. Response times can be either user-selected or the defaults shown in the table.

Table 9-7 Elements Required to Define Response Reports

Response Report	Major Sort (Report Code)	Minor Sort	Timing Defaults
Transaction Response Report	TRAN	LTERM	INQ,ELP,RSP
Terminal Response Report	TERM	TRANCODE	RSP,OUT
Program Response Report	PROG	TRANCODE	INQ,ELP
Line Response Report	LINE	PTERM	RSP,OUT
Class Response Report	CLAS	TRANCODE	INQ,ELP
Routing Code Response Report	ROUT	TRANCODE	INQ,ELP,RSP
Security User ID Report	USER	TRANCODE	INQ,ELP,RSP
Customer ID Report (This report should be used only when the customer ID is always eight bytes or fewer.)	CUST	TRANCODE	INQ,ELP,RSP

The following considerations apply in defining response reports:

- If no definition statements are submitted, both the Transaction and Terminal Response reports are produced, using the timing defaults specified above.

- If subtotals are not specifically requested with a value of Y, subtotal lines are not produced.

- A maximum of nine timings can be selected for a report. You can select one or more timings by specifying any of the defined three-letter codes, described in the next section, in the timing selection code fields of a control statement. The selected timings appear on a report in the same order as specified on the statement. If none are specified, timing defaults for the selected report are used.

Control Statement Timing Selection Codes

Table 9-8 shows the valid codes that can be entered in the timing selection code fields of a PRSRESP control statement (see “Selecting Reports and Timings” on page 9-17).

Table 9-8 Valid Timing Selection Codes

Code	Timing	Description
RSP	RESPONSE	Arrival time to message sent time
INQ	INPUT Q	Arrival time to start time
ELP	ELAPSED	Start time to stop time
RDQ	RSP TO DEQ	Arrival time to message dequeue time
OUT	OUTPUT Q	Message insert time to message sent time
DEQ	DEQUEUE	Message sent time to message dequeue time
ODQ	OUT TO DEQ	Message insert time to message dequeue time
AST	ARIV START	Arrival time to start time
ASP	ARIV STOP	Arrival time to stop time

The definition and calculation of these timings by MVIMS is described in “IRUF Collection of IMS Elapsed Processing Timings” on page 9-8.

Selecting Terminal-Related Transactions

The TERMIN report control statement allows users to generate a report that contains the response time for a complete transaction. This response time excludes interim message switch events, providing statistics only about actual response time experienced by the LTERM user.

Table 9-9 shows report control statement syntax for terminal-related transactions.

Table 9-9 Report Statement Syntax – Terminal-Related Transactions

Position	Input
01 – 06	Report code: TERMIN
07 – 80	User-definable comments, such as: terminal transactions only

Return Codes

This section describes the return codes that indicate the results of PRSRESP execution.

Code	Explanation
028	Invalid delimiter was found in the time period selection. A required comma is missing or was specified incorrectly.
032	Year of the Julian date is invalid or the day is out of range (001 – 366) for the selection low date.
036	Time of day is out of range (0000 – 2359) for the selection low time.
040	Year of the Julian date is invalid or the day is out of range (001 – 366) for the selection high date.
044	Time of day is out of range (0000 – 2359) for the selection high time.
048	High date/time selection (yydd,hhmm) is less than the low date/time (yyddd,hhmm).
052	Invalid system ID delimiter was found. A required comma is missing or was specified incorrectly.
056	System identifier contains a blank or invalid delimiter.
060	Invalid sort size delimiter was found. A required comma is missing or was specified incorrectly.
064	Sort size was specified incorrectly. The value given was either not six digits long, not numeric, or less than 18000.
128	Error was detected in the control card analysis. Refer to the Response Audit report for the specific error message (or messages).
132	Internal sort returned with an unsuccessful status.
136	No IRUF records met selected criteria. Most likely either TASCOSTR or IMFLEDIT was run without the R option on the PARM statement, resulting in blanks in the R OPTION field of the transaction accounting record (see the *MAINVIEW for IMS Offline – Customization and Utilities Guide*). Rerun TASCOSTR or IMFLEDIT with the R option specified on the PARM statement.

Chapter 10 Calendar Reports (PRSCLNDR)

The calendar reports are used to evaluate IMS performance by transaction, program, terminal, database, DB2 subsystem, response time, system availability, and system CPU time. The reports have a month-calendar format showing daily and monthly transaction and program activity profiles.

Objectives:

- Profile transaction processing by transaction CPU times, message calls, database I/O, and input/output character counts.
- Profile program processing by number of programs, elapsed time, CPU time, program scheduling time, and number of ABENDs.
- Profile terminal activity (per transaction) by message GU/GN, input/output character counts, message inserts, and ratio of input/output character counts to input/output message calls.
- Profile database activity (per transaction) by GET and UPDATE calls, reads and writes, NO I/O, and number of databases used.
- Profile DB2 subsystem activity (per transaction) by number of transactions accessing a DB2 subsystem, daily DB2 transaction percentage for that month, daily DB2 CPU time percentage, and average number of SQL get (SELECT and FETCH) and update (INSERT, DELETE, and UPDATE) calls of the daily transaction total.
- Profile response time by number of transactions, transaction arrival rate, input queue time, elapsed time, output queue time, and dequeue time.
- Profile system availability by elapsed time, total CPU time, number of sessions and terminals, number of MPPs or JMPs, and BMPs or JBPs in use.
- Profile system CPU time by percentage of DL/I and DB2, buffer handler, application program, program scheduling, and overhead CPU times.

Uses:

- Determine, by day, the percentage of transaction and program time used, input and output character counts, database read and write activity, and DB2 subsystem request activity.
- Determine, by day, percentage of elapsed time, response time, transaction arrival rate, input queue time, output queue time, total CPU time, DL/I and DB2 time, buffer handler time, application program time, and program scheduling time that was consumed.
- Provide monthly totals for transactions, CPU time, program loads, maximum terminals used, maximum databases used, and elapsed time.
- Provide monthly averages for database I/O and DB2 subsystem activity, terminal I/O activity, number of ABENDs (user and system), elapsed time, program scheduling time, and response time.
- Identify those days during the month with the most or least IMS activity and balance transaction workload as necessary.

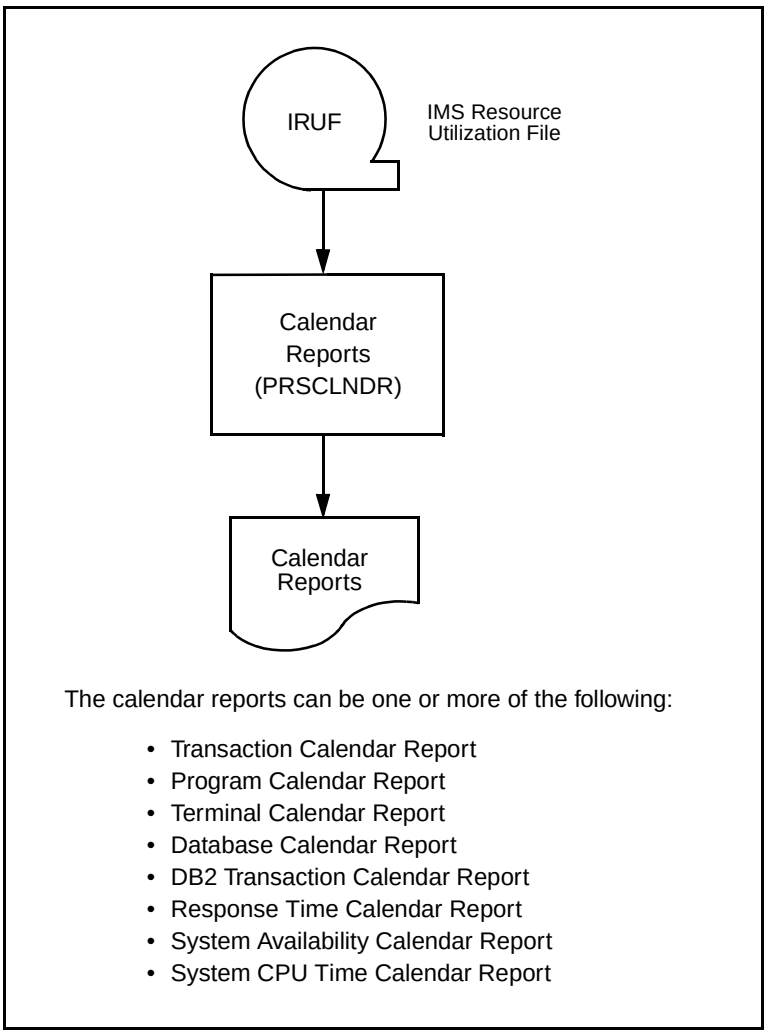
Input and Output

A detail or summarized IRUF is the input to PRSCLNDR. User-written control statements specify a month's worth of IRUF data to be reported and select the type of calendar report from the following options:

- Transaction Calendar Report
- Program Calendar Report
- Terminal Calendar Report
- Database Calendar Report
- DB2 Transaction Calendar Report
- Response Time Calendar Report
- System Availability Calendar Report
- System CPU Time Calendar Report

Figure 10-1 shows system flow for PRSCLNDR.

Figure 10-1 PRSCLNDR System Flow



Summarized IRUF Input

If a summarized IRUF is used to produce the calendar report, some report data may be bypassed. The placement of data on the reports is based on start date. A summarized IRUF may have data that falls prior to the start date and after the end date. The reports, as requested, will still be produced, but the figures may be skewed. If the IRUF is summarized by day, the skewing problem should be eliminated.

The following message is issued for each record skipped due to record data not being equal to the report start or end date:

```
IRUF TYPE = x CUST ID = nnnn
START/STOP DATES MUST BE SAME FOR ACCURATE REPORT
```

The *x* value will be one of the following letters:

- L Terminal (LTERM) accounting record (LAR) data
- T Transaction accounting record (TAR) data
- P Program accounting record (PAR) data

The *nnnn* value represents the customer ID of the record skipped.

Partial-Month IRUF Input

The user-written PRSCLNDR control statements specify a month's worth of data. However, you can use the PRSSELEC time period keyword parameter to report only a partial month. Figure 10-2 on page 10-5 illustrates one day's worth of data for the Transaction Calendar Report. The blank boxes indicate that no transactions were processed on that day. All other reports will also have blanks for days with no data to report.

Figure 10-2 Transaction Calendar Report (One Day's Worth of Data)

```
**** IMF ****                              IMS PERFORMANCE REPORTER                              **** IMF ****
CURRENT DATE - 03/22/yy                  TRANSACTION CALENDAR REPORT
                                              JANUARY 20yy
*****************************************************************************************************************
*   S U N D A Y   *   M O N D A Y   *   T U E S D A Y  * W E D N E S D A Y* T H U R S D A Y *   F R I D A Y   *S A T U R D A Y *
*****************************************************************************************************************
*       1       *       2       *       3       *       4       *       5       *       6       *       7       *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*****************************************************************************************************************
*       8       *       9       *       10      *       11      *       12      *       13      *       14      *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*****************************************************************************************************************
*       15      *       16      *       17      *       18      *       19      *       20      *       21      *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*****************************************************************************************************************
*       22      *       23      *       24      *       25      *       26      *       27      *       28      *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*****************************************************************************************************************
*       29      *       30      *       31      *               *               *               *               *
*#TRN     30,459  *               *               *               *               *               *               *
*%TRANS   100.0%  *               *               *               *               *               *               *
*C-TIME    0.052 +*               *               *               *               *               *               *
*M-CALS      6.0  *               *               *               *               *               *               *
*M-CHR    1400.9  *               *               *               *               *               *               *
*D-CALS     51.5  *               *               *               *               *               *               *
*DB I/O      3.7  *               *               *               *               *               *               *
*****************************************************************************************************************

                  TOTAL TRANSACTIONS      30,459        AVG MSG CALLS          6.0
                        AVG DB I/O          3.7         AVG MSG CHRS       1,400.9
                       AVG DB CALLS        51.5         AVG CPU TIME         0.052
```

Report Element Descriptions

This section describes each element of the reports produced PRSCLNDR.

DBCTL Threads:

DBCTL CICS and ODBA thread activity can be reported by PRSCLNDR. By default, DBCTL transactions are not included in the calendar reports because DBCTL threads may affect some of the averages per transaction for some fields.

When you include DBCTL threads in the calendar reports, consider these points:

- CICS=YES or CICS=OFFLINE must be specified for the Event Collector in BBPARM member IMFECP00.
- DBT=YES (the default) must be specified as described in “Keyword Statements” on page 10-36.

If DBCTL threads are reported, consider the following points when you examine the reports for historical trends.

- **Input queue time.** Zero is used for DBCTL threads, which tends to lower the averages for non-DBCTL transactions if DBCTL threads are included.
- **Elapsed time.** If you have conversational CICS transactions, they tend to raise the average elapsed time and response time.
- **Response time.** If you generated the IRUF with the response option, the response time for DBCTL threads is zero, which tends to lower the averages for non-DBCTL transaction response time if the DBCTL threads are included.
- **Terminal-related data.** Message queue and character counts are zero for DBCTL transactions, which lowers the averages for non-DBCTL transactions in these reports if DBCTL threads are included.
- **CPU time.** CPU time for DBCTL threads is only the time spent processing the DL/I requests, which tends to lower the CPU time-related averages for non-DBCTL transactions if DBCTL transactions are included.
- **System Availability Calendar Report.** Active DBCTL threads are included in the #MPP UP field.

TPI Transactions:

TPI transactions are similar to DBCTL threads in that they have no input queue time, response time, or terminal-related data. You can exclude them by specifying the TPI keyword as described in “Keyword Statements” on page 10-36.

Transaction Calendar Report

Figure 10-3 shows an example of the Transaction Calendar Report, showing data collected over several days.

Figure 10-3 Transaction Calendar Report

```
**** IMF ****                              IMS PERFORMANCE REPORTER                                  **** IMF ****
CURRENT DATE - 03/22/yy <1>                TRANSACTION CALENDAR REPORT  <2>
                                                 JANUARY 20yy <3>
*************************************************************************************************************************
*   S U N D A Y   *   M O N D A Y   *   T U E S D A Y  * W E D N E S D A Y* T H U R S D A Y *   F R I D A Y   *S A T U R D A Y *
*************************************************************************************************************************
*        1        *        2        *        3        *        4        *        5        *        6        *        7        *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*************************************************************************************************************************
*        8        *        9        *        10       *        11       *        12       *        13       *        14       *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*************************************************************************************************************************
*       15        *       16        *       17        *       18        *       19        *       20        *       21        *
*                 *                 *                 *                 *                 *                <4>* #TRN      1,292 *
*                 *                 *                 *                 *                 *                <5>* %TRANS      0.6% *
*                 *                 *                 *                 *                 *                <6>* C-TIME    0.039 *
*                 *                 *                 *                 *                 *                <7>* M-CALS      7.4 *
*                 *                 *                 *                 *                 *                <8>* M-CHR    4462.2 *
*                 *                 *                 *                 *                 *                <9>* D-CALS     25.5 *
*                 *                 *                 *                 *                 *               <10>* DB I/O      4.9 *
*************************************************************************************************************************
*       22        *       23        *       24        *       25        *       26        *       27        *       28        *
*#TRN        108  * #TRN     31,234  * #TRN     35,371  * #TRN     47,286  * #TRN     20,536  * #TRN     21,930  * #TRN      1,386 *
*%TRANS      0.0% * %TRANS    15.4%  * %TRANS    17.4%  * %TRANS    23.3%  * %TRANS    10.1%  * %TRANS    10.8%  * %TRANS      0.6% *
*C-TIME     0.044 * C-TIME    0.033  * C-TIME    0.022  * C-TIME    0.035  * C-TIME    0.024  * C-TIME    0.028  * C-TIME     0.019 *
*M-CALS       4.2 * M-CALS      4.0  * M-CALS      3.9  * M-CALS      4.0  * M-CALS      3.8  * M-CALS      4.0  * M-CALS       7.6 *
*M-CHR     4463.2 * M-CHR    3425.6  * M-CHR    3461.4  * M-CHR    3457.3  * M-CHR    3519.1  * M-CHR    3666.7  * M-CHR     4246.2 *
*D-CALS       4.3 * D-CALS     11.4  * D-CALS     12.7  * D-CALS     10.8  * D-CALS     11.3  * D-CALS     20.4  * D-CALS      10.5 *
*DB I/O       1.0 * DB I/O      6.2  * DB I/O      6.3  * DB I/O      6.7  * DB I/O      7.5  * DB I/O      7.9  * DB I/O       2.0 *
*************************************************************************************************************************
*       29        *       30        *                 *                 *                 *                 *                 *
*#TRN        379  * #TRN     42,808  *                 *                 *                 *                 *                 *
*%TRANS      0.1% * %TRANS    21.1%  *                 *                 *                 *                 *                 *
*C-TIME     0.032 * C-TIME    0.024  *                 *                 *                 *                 *                 *
*M-CALS       3.9 * M-CALS      3.7  *                 *                 *                 *                 *                 *
*M-CHR     3366.9 * M-CHR    3572.2  *                 *                 *                 *                 *                 *
*D-CALS       1.5 * D-CALS     11.4  *                 *                 *                 *                 *                 *
*DB I/O       0.6 * DB I/O      6.9  *                 *                 *                 *                 *                 *
*************************************************************************************************************************

          <11> TOTAL TRANSACTIONS     202,330    <14> AVG MSG CALLS          4.0
               <12> AVG DB I/O            6.7    <15> AVG MSG CHRS       3,518.6
              <13> AVG DB CALLS          12.5    <16> AVG CPU TIME         0.028
```

Table 10-1 describes Transaction Calendar Report elements. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 10-1 Transaction Calendar Report Elements (Part 1 of 2)

<1> CURRENT DATE Date this report was generated, in mm/dd/yy format.
<2> title Name that identifies the type of report.
<3> month year Month and year of the transaction data being reported.
<4> #TRN Sum of the transactions processed on this day.
<5> %TRANS Daily percentage of transactions processed for this month, computed as `(Daily Transaction Count ÷ Monthly Count) × 100`
<6> C-TIME+ Average CPU time required to execute transactions on this day. A plus sign in this field indicates that DB2 CPU time is included. This time is computed as `Total CPU Time Attributable to a Transaction ÷ Daily transaction Count` For more information, see “CPU Timing” on page 2-7 and “DB2 CPU” on page 2-8.
<7> M-CALS Average number of message calls issued by transactions, computed as `(Message GU Count + Message GN Count + Message Insert Count + Message Purge Count + Message Other Count) ÷ Daily Transaction Count`
<8> M-CHR Average number of message characters transferred by transactions, computed as `(Input Character Count + Output Character Count + Alternate Terminal Character Count + Output Other Character Count) ÷ Daily Transaction Count`
<9> D-CALS Average number of database calls made by transactions on this day, computed as `(GU Count + GN Count + ISRT Count + DLET Count + REPL Count + Other Count) ÷ Daily Transaction Count`
<10> DB I/O Average number of database reads and writes, computed as `(Key Reads and Writes + Nonkey Reads and Writes) ÷ Daily Transaction Count` For more information, see “Database I/O Data” on page 2-12.
<11> TOTAL TRANSACTIONS Total number of transactions processed during this month.

Table 10-1 Transaction Calendar Report Elements (Part 2 of 2)

<12> AVG DB I/O The average monthly database read/write count, computed as `Monthly Read/Write Count ÷ Monthly Transaction Count` For more information, see “Database I/O Data” on page 2-12.
<13> AVG DB CALLS Average monthly database GET and UPDATE calls, computed as `Monthly (GU + GN + ISRT + DLET + REPL + OTHER) Count ÷ Monthly Transaction Count`
<14> AVG MSG CALLS Average monthly message call count, computed as `Monthly Message (GU + GN + ISRT + PURGE + OTHER) Count ÷ Monthly Transaction Count`
<15> AVG MSG CHRS Average monthly message character count, computed as `Monthly Message Character Count ÷ Monthly Transaction Count`
<16> AVG CPU TIME Average CPU time per transaction in tenths of seconds for this month, computed as `Total Transaction CPU Time ÷ Total Transactions` For more information, see “CPU Timing” on page 2-7.

Program Calendar Report

Figure 10-4 provides an example of the Program Calendar Report.

Figure 10-4 Program Calendar Report

```
**** IMF ****                                IMS PERFORMANCE REPORTER                                  **** IMF ****
CURRENT DATE - 03/22/yy <1>                   PROGRAM CALENDAR REPORT <2>
                                                 JANUARY 20yy <3>
*****************************************************************************************************************************
*   S U N D A Y   *   M O N D A Y   *   T U E S D A Y  * W E D N E S D A Y* T H U R S D A Y *   F R I D A Y   *S A T U R D A Y *
*****************************************************************************************************************************
*       1       *       2       *       3       *       4       *       5       *       6       *       7       *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*****************************************************************************************************************************
*       8       *       9       *       10      *       11      *       12      *       13      *       14      *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*****************************************************************************************************************************
*       15      *       16      *       17      *       18      *       19      *       20      *       21      *
*               *               *               *               *               *               *<4>* #PROG          1*
*               *               *               *               *               *               *<5>* %PROG        0.0%*
*               *               *               *               *               *               *<6>* #TRANS  1292.000*
*               *               *               *               *               *               *<7>* E-TIME      0.740*
*               *               *               *               *               *               *<8>* C-TIME     51.469*
*               *               *               *               *               *               *<9>* PS-TIME     0.000*
*               *               *               *               *               *               *<10>* #ABENDS        0*
*****************************************************************************************************************************
*       22      *       23      *       24      *       25      *       26      *       27      *       28      *
*               * #PROG      407 * #PROG      505 * #PROG    1,074 * #PROG       80 * #PROG       98 *               *
*               * %PROG    15.9% * %PROG    19.7% * %PROG    42.0% * %PROG     3.1% * %PROG     3.8% *               *
*               * #TRANS  76.742 * #TRANS  70.041 * #TRANS  44.027 * #TRANS 256.700 * #TRANS 223.775 *               *
*               * E-TIME   1.324 * E-TIME   0.336 * E-TIME   0.371 * E-TIME   0.322 * E-TIME   9.922 *               *
*               * C-TIME   2.603 * C-TIME   1.565 * C-TIME   1.569 * C-TIME   6.366 * C-TIME   6.269 *               *
*               * PS-TIME  0.000 * PS-TIME  0.000 * PS-TIME  0.000 * PS-TIME  0.000 * PS-TIME  0.000 *               *
*               * #ABENDS      0 * #ABENDS      0 * #ABENDS      0 * #ABENDS      0 * #ABENDS      0 *               *
*****************************************************************************************************************************
*       29      *       30      *               *               *               *               *               *
*               * #PROG      388 *               *               *               *               *               *
*               * %PROG    15.1% *               *               *               *               *               *
*               * #TRANS 110.329 *               *               *               *               *               *
*               * E-TIME   0.404 *               *               *               *               *               *
*               * C-TIME   2.746 *               *               *               *               *               *
*               * PS-TIME  0.000 *               *               *               *               *               *
*               * #ABENDS      0 *               *               *               *               *               *
*****************************************************************************************************************************

          <11> TOTAL PROGRAM LOADS       2,553   <14> AVG PROGRAM ELAPSED TIME       0.887
        <12> TRANSACTIONS PER LOAD        79.2   <15> AVG PROG SCHD TIME             0.000
              <13> TOTAL # ABENDS            0   <16> AVG PROG CPU TIME              2.280
```

Table 10-2 describes Program Calendar Report elements. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 10-2 Program Calendar Report Elements (Part 1 of 2)

<1>	**CURRENT DATE** Date this report was generated, in mm/dd/yy format.
<2>	**title** Name that identifies the type of report.
<3>	**month year** Month and year of the program data being reported.
<4>	**#PROG** Sum of the programs loaded on this day.
<5>	**%PROG** Daily percentage of programs loaded for this month, computed as `(Daily Program Load Count ÷ Monthly Load Count) × 100`
<6>	**#TRANS** Average number of transactions processed per program load on this day, computed as `Daily Transaction Count ÷ Daily Program Count`
<7>	**E-TIME** Average program elapsed time for this day, computed as `Total Program Elapsed Time ÷ Daily Program Count`
<8>	**C-TIME+** Average CPU time for this day. A plus sign in this field indicates that DB2 CPU time is included. This time is computed as `Total CPU Time Attributable to a Program ÷ Daily Program Count` For more information, see “CPU Timing” on page 2-7 and “DB2 CPU” on page 2-8.
<9>	**PS-TIME** Average program scheduling time required on this day, computed as `Total Program Schedule Time ÷ Daily Program Count` For more information, see “Program Scheduling CPU” on page 2-10.
<10>	**#ABENDS** Sum of user and system ABENDs recorded on this day.
<11>	**TOTAL PROGRAM LOADS** Total number of program loads made for this month.
<12>	**TRANSACTIONS PER LOAD** Number of transactions processed per program load during this month, computed as `Monthly Transaction Count ÷ Monthly Program Count`

Table 10-2 Program Calendar Report Elements (Part 2 of 2)

<13> TOTAL # ABENDS Total number of ABENDs recorded for this month.
<14> AVG PROGRAM ELAPSED TIME Average monthly program elapsed time, computed as `Monthly Elapsed Time Total ÷ Monthly Program Count`
<15> AVG PROG SCHD TIME Average monthly program scheduling CPU time, computed as `Monthly Program Schedule CPU Time ÷ Monthly Program Count` For more information, see “Program Scheduling CPU” on page 2-10.
<16> AVG PROG CPU TIME Average monthly CPU time, computed as `Monthly CPU Time (C-TIME) ÷ Monthly Program Count` For more information, see “CPU Timing” on page 2-7.

Terminal Calendar Report

Figure 10-5 shows an example of the Terminal Calendar Report.

Figure 10-5 Terminal Calendar Report

```
**** IMF ****                                IMS PERFORMANCE REPORTER                                **** IMF ****
CURRENT DATE - 03/22/yy <1>                   TERMINAL CALENDAR REPORT <2>
                                                 JANUARY 20yy <3>
```

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
					<4> #TERMS 15	
					<5> I-CALS 3.7	
					<6> I-CHRS 814.7	
					<7> IC/ICL 219.7	
					<8> O-CALS 3.6	
					<9> O-CHRS 1076.2	
					<10> OC/OCL 297.0	
22	23	24	25	26	27	28
#TERMS 4	#TERMS 266	#TERMS 228	#TERMS 245	#TERMS 189	#TERMS 177	#TERMS 12
I-CALS 1.9	I-CALS 1.7	I-CALS 1.8	I-CALS 1.9	I-CALS 1.8	I-CALS 1.8	I-CALS 3.3
I-CHRS 446.0	I-CHRS 324.1	I-CHRS 312.8	I-CHRS 320.8	I-CHRS 389.1	I-CHRS 344.8	I-CHRS 604.8
IC/ICL 225.1	IC/ICL 180.7	IC/ICL 173.4	IC/ICL 164.2	IC/ICL 213.5	IC/ICL 181.9	IC/ICL 179.0
O-CALS 2.0	O-CALS 2.0	O-CALS 1.8	O-CALS 1.9	O-CALS 1.8	O-CALS 2.0	O-CALS 3.1
O-CHRS 1167.4	O-CHRS 924.6	O-CHRS 862.5	O-CHRS 708.5	O-CHRS 872.6	O-CHRS 958.8	O-CHRS 841.2
OC/OCL 583.7	OC/OCL 448.3	OC/OCL 454.2	OC/OCL 368.6	OC/OCL 462.3	OC/OCL 476.2	OC/OCL 268.5
29	30					
#TERMS 2	#TERMS 322					
I-CALS 2.0	I-CALS 1.7					
I-CHRS 202.2	I-CHRS 345.2					
IC/ICL 98.2	IC/ICL 192.1					
O-CALS 1.8	O-CALS 1.8					
O-CHRS 483.0	O-CHRS 785.6					
OC/OCL 255.3	OC/OCL 435.4					

```
  MAX TERMINALS USED W/I MONTH <11>  322  AVG I/P CALLS  <12>   1.8   AVG O/P CALLS        1.9 <15>
                                          AVG I/P CHARS  <13> 339.6   AVG O/P CHARS      832.0 <16>
                                          I-CHRS/I-CALS  <14> 181.5   O-CHRS/O-CALS      428.8 <17>
```

Table 10-3 describes Terminal Calendar Report elements. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 10-3 Terminal Calendar Report Elements (Part 1 of 2)

<1> CURRENT DATE Date this report was generated, in mm/dd/yy format.
<2> title Name that identifies the type of report.
<3> month year Month and year of the terminal data being reported.
<4> #TERMS Number of LTERMS that submitted transactions on this day.
<5> I-CALS Average number of input message calls received by all LTERMs on this day, computed as `(Message GU Count + Message GN Count) ÷ Daily Transaction Total`
<6> I-CHRS Average number of input characters per transaction transmitted by all LTERMs on this day, computed as `Input Character Count ÷ Daily Transaction Total`
<7> IC/ICL Ratio of input characters to input calls on this day, computed as `Total Input Character Counts ÷ Sum of Input Call Counts`
<8> O-CALS Average number of message insert calls on this day, computed as `Insert Count ÷ Daily Transaction Total`
<9> O-CHRS Average number of output characters per transaction transmitted by all LTERMs on this day, computed as `(Output Character Count + Alternate Terminal Output Count) ÷ Daily Transaction Total`
<10> OC/OCL Ratio of output characters to output calls on this day, computed as `Total Output Character Counts ÷ Sum of Output Call Counts`
<11> MAX TERMINALS USED W/I MONTH Maximum number of LTERMs on any one day within the month that submitted transactions.
<12> AVG I/P CALLS Average monthly input message call count, computed as `Total Input Calls ÷ Total Transaction Count`

Table 10-3 Terminal Calendar Report Elements (Part 2 of 2)

<13> AVG I/P CHARS Average monthly input character count, computed as `Total Input Characters ÷ Total Transaction Count`
<14> I-CHRS/I-CALS Ratio of input characters to input calls for this month.
<15> AVG O/P CALLS Average monthly output message call count, computed as `Total Output Calls ÷ Total Transaction Count`
<16> AVG O/P CHARS Average monthly output character count, computed as `Total Output Characters ÷ Total Transaction Count`
<17> O-CHRS/O-CALS Ratio of output characters to output calls for this month.

Database Calendar Report

Figure 10-6 provides an example of the Database Calendar Report.

Figure 10-6 Database Calendar Report

```
**** IMF ****                                IMS PERFORMANCE REPORTER                                **** IMF ****
CURRENT DATE - 03/22/yy <1>                   DATABASE CALENDAR REPORT <2>
                                                    JANUARY 20yy <3>
```

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
						<4> #DB 49
						<5> G-CALS 21.4
						<6> U-CALS 4.1
						<7> READS 3.7
						<8> WRITES 1.1
						<9> N-I/O 0.0
						<10> IO/CAL 0.1
22	23	24	25	26	27	28
#DB 9	#DB 186	#DB 185	#DB 185	#DB 179	#DB 164	#DB 53
G-CALS 3.0	G-CALS 10.3	G-CALS 11.6	G-CALS 9.7	G-CALS 10.2	G-CALS 19.3	G-CALS 8.3
U-CALS 1.3	U-CALS 1.0	U-CALS 1.0	U-CALS 1.1	U-CALS 1.1	U-CALS 1.0	U-CALS 2.2
READS 0.8	READS 5.6	READS 5.8	READS 6.1	READS 6.8	READS 7.2	READS 1.4
WRITES 0.1	WRITES 0.6	WRITES 0.5	WRITES 0.5	WRITES 0.6	WRITES 0.6	WRITES 0.5
N-I/O 0.0	N-I/O 0.0	N-I/O 0.0	N-I/O 0.0	N-I/O 0.0	N-I/O 0.0	N-I/O 0.0
IO/CAL 0.2	IO/CAL 0.5	IO/CAL 0.5	IO/CAL 0.6	IO/CAL 0.6	IO/CAL 0.3	IO/CAL 0.1
29	30					
#DB 10	#DB 194					
G-CALS 1.3	G-CALS 10.3					
U-CALS 0.1	U-CALS 1.0					
READS 0.6	READS 6.3					
WRITES 0.0	WRITES 0.5					
N-I/O 0.0	N-I/O 0.0					
IO/CAL 0.4	IO/CAL 0.6					

```
  MAX DATABASES                  AVG GETS  <12>  11.4   AVG READS   <15>    6.1
  USED W/I MONTH   <11>  194     AVG UPDS  <13>   1.1  AVG WRITES   <16>    0.6
                                DBIO/CALLS <14>   0.5   AVG NO IO   <17>    0.0
```

Table 10-4 describes Database Calendar Report elements. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 10-4 Database Calendar Report Elements (Part 1 of 2)

<1>	**CURRENT DATE** Date this report was generated, in mm/dd/yy format.
<2>	**title** Name that identifies the type of report.
<3>	**month year** Month and year of the database data being reported.
<4>	**#DB** Number of unique databases that were active on this day.
<5>	**G-CALS** Average number of GET calls on this day, computed as `Database (GU + GHU + GN + GHN + GNP + GHNP) Call Count ÷ Transaction Total`
<6>	**U-CALS** Average number of UPDATE calls on this day, computed as `(Database Insert Count + Database Delete Count + Database Replace Count) ÷ Daily Transaction Total`
<7>	**READS** Average number of database reads on this day, computed as `(Key Reads + Nonkey Reads) ÷ Daily Transaction Total`
<8>	**WRITES** Average number of database writes on this day, computed as `(Key Writes + Nonkey Writes) ÷ Daily Transaction Total` For more information, see “Database Writes” on page 2-13.

<9>	**N-I/O**
	Average number of NO I/O counts on this day, computed as
	`(NO Input + NO Output) ÷ Daily Transaction Total`
	`(Key Writes + Nonkey Writes) ÷ Daily Transaction Total`
	For more information, see “NO I/O” on page 2-13.

<10>	**IO/CAL** Ratio of all database I/Os to the number of DL/I calls on this day, computed as `Reads + Writes ÷ Gets + Updates`
<11>	**MAX DATABASES USED W/I MONTH** Maximum number of databases accessed on any one day within the month.

Table 10-4 Database Calendar Report Elements (Part 2 of 2)

<12> AVG GETS Average monthly database GET count, computed as `Total Get Count ÷ Total Transaction Count`
<13> AVG UPDS Average monthly database update count, computed as `Total Update Count ÷ Total Transaction Count`
<14> DBIO/CALLS Ratio of database I/O to DL/I calls for this month. For more information, see “Database Reads” on page 2-12 and “Database Writes” on page 2-13.
<15> AVG READS Average monthly database read count, computed as `Total Reads ÷ Total Transaction Count` For more information, see “Database Reads” on page 2-12.
<16> AVG WRITES Average monthly database write count, computed as `Total Writes ÷ Total Transaction Count` For more information, see “Database Writes” on page 2-13.
<17> AVG NO IO Average monthly database NO I/O count, computed as `Total NO I/O ÷ Total Transactions` For more information, see “NO I/O” on page 2-13.

DB2 Transaction Calendar Report

Figure 10-7 shows an example of the DB2 Transaction Calendar Report.

Figure 10-7 DB2 Transaction Calendar Report

```
**** IMF ****                              IMS PERFORMANCE REPORTER                              **** IMF ****
CURRENT DATE - 03/22/yy <1>                DB2 TRANSACTION CALENDAR REPORT <2>
                                                  JANUARY 20yy <3>
*****************************************************************************************************************************
*   S U N D A Y   *   M O N D A Y   *   T U E S D A Y   * W E D N E S D A Y* T H U R S D A Y *   F R I D A Y   *S A T U R D A Y *
*****************************************************************************************************************************
*       1         *         2       *         3       *         4       *         5       *         6       *         7       *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*****************************************************************************************************************************
*       8         *         9       *         10      *         11      *         12      *         13      *         14      *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*****************************************************************************************************************************
*       15        *         16      *         17      *         18      *         19      *         20      *         21      *
*#-DB2         180 *<4>              *                 *                 *                 *                 *                 *
*%-DB2         0.5% *<5>             *                 *                 *                 *                 *                 *
*D-TIME      0.011 *<6>              *                 *                 *                 *                 *                 *
*%-CPU         0.1% *<7>             *                 *                 *                 *                 *                 *
*G-SQL            0 *<8>             *                 *                 *                 *                 *                 *
*U-SQL            1 *<9>             *                 *                 *                 *                 *                 *
*D-CALS          36 *<10>            *                 *                 *                 *                 *                 *
*****************************************************************************************************************************
*       22        *         23      *         24      *         25      *         26      *         27      *         28      *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*****************************************************************************************************************************
*       29        *         30      *         31      *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*****************************************************************************************************************************

          <11> TOTAL DB2 TRANSACTIONS         180        % DB2 CPU TIME         0.11% <14>
          <12> AVG SQL GET DATA CALLS           0        TOTAL DB2 CPU          2.15  <15>
          <13> AVG SQL UPDATE CALLS             1        AVG DL/I CALLS           36  <16>
```

Table 10-5 describes DB2 Transaction Calendar Report elements. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 10-5 DB2 Transaction Calendar Report Elements (Part 1 of 2)

<1> CURRENT DATE Date this report was generated, in mm/dd/yy format.
<2> title Name that identifies the type of report.
<3> month year Month and year of the DB2 activity being reported.
<4> #-DB2 Number of transactions that accessed a DB2 subsystem.
<5> %-DB2 Percentage of DB2 transactions out of total transactions for this day, computed as `(Number of DB2 Transactions for the Day ÷ Total Transactions for the Day) × 100`
<6> D-TIME Average DB2 CPU time per transaction. For more information, see “DB2 CPU” on page 2-8.
<7> %-CPU Percentage of DB2 CPU time out of total CPU time for this day, computed as `(DB2 CPU Time ÷ Total CPU Time) × 100`
<8> G-SQL Average number of SQL GET data calls issued per day, computed as `(SQL SELECT + FETCH Calls) ÷ Daily Transaction Total`
<9> U-SQL Average number of SQL UPDATE calls per transaction, computed as `(SQL INSERT + DELETE + UPDATE Calls) ÷ Daily Transaction Total`
<10> D-CALS Average number of DL/I calls per DB2 transaction, computed as `Database (GU + GHU + GN + GHN + GHP + GHNP + DLET + ISRT + REPL) Calls ÷ Daily DB2 Transaction Total`
<11> TOTAL DB2 TRANSACTIONS Total DB2 transactions for the month.
<12> AVG SQL GET DATA CALLS Average number of SQL get data calls issued per month, computed as `(SQL SELECT + FETCH) ÷ Total Number of Transactions for the Month`

Table 10-5 DB2 Transaction Calendar Report Elements (Part 2 of 2)

<13> AVG SQL UPDATE CALLS	Average number of SQL update calls per transaction, computed as `(SQL INSERT + DELETE + UPDATE Calls) ÷ Transaction Total`
<14> %DB2 CPU TIME	Monthly percentage of DB2 CPU usage, computed as `(DB2 CPU Usage ÷ Total CPU Time) × 100`
<15> TOTAL DB2 CPU	Total amount of DB2 CPU time consumed for the month. For more information, see “DB2 CPU” on page 2-8.
<16> AVG DL/I CALLS	Average number of DL/I database calls per transaction, computed as `Database (GU + GHU + GN + GHN + GNP + GHNP + DLET + ISRT + REPL) Calls ÷ Transaction Total` For more information, see “Database I/O Data” on page 2-12.

Response Time Calendar Report – with Response Option

The Response Time Calendar Report, with response option, is produced if the IMFLEDIT response option is specified (see the Log Edit chapter in the *MAINVIEW for IMS Offline – Customization and Utilities Guide*).

Figure 10-8 provides an example of the Response Time Calendar Report with the response option specified.

Figure 10-8 Response Time Calendar Report – with Response Option

```
**** IMF ****                                IMS PERFORMANCE REPORTER                                **** IMF ****
CURRENT DATE - 03/22/yy <1>          RESPONSE TIME CALENDAR REPORT (WITH RESPONSE OPTION) <2>
                                              JANUARY 20yy <3>
*************************************************************************************************************************
*   S U N D A Y   *   M O N D A Y   *  T U E S D A Y  * W E D N E S D A Y* T H U R S D A Y *   F R I D A Y   *S A T U R D A Y *
*************************************************************************************************************************
*       1       *       2       *       3       *       4       *       5       *       6       *       7       *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*************************************************************************************************************************
*       8       *       9       *       10      *       11      *       12      *       13      *       14      *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*************************************************************************************************************************
*      15       *       16      *       17      *       18      *       19      *       20      *       21      *
*               *               *               *               *               *            <4>* #TRAN      1,291*
*               *               *               *               *               *            <5>* A-RATE     0.014*
*               *               *               *               *               *            <6>* R-TIME     10.89*
*               *               *               *               *               *            <7>* IQ-TIME    10.66*
*               *               *               *               *               *            <8>* E-TIME      0.22*
*               *               *               *               *               *            <9>* OQ-TIME     2.01*
*               *               *               *               *               *           <10>* DQ-TIME     5.52*
*************************************************************************************************************************
*      22       *       23      *       24      *       25      *       26      *       27      *       28      *
*#TRAN       108 * #TRAN    31,110 * #TRAN    35,066 * #TRAN    47,145 * #TRAN    20,448 * #TRAN    21,820 * #TRAN    1,385*
*A-RATE    0.000 * A-RATE    0.214 * A-RATE    0.274 * A-RATE    0.368 * A-RATE    0.292 * A-RATE    0.202 * A-RATE    0.015*
*R-TIME     0.87 * R-TIME     2.38 * R-TIME     0.99 * R-TIME    18.82 * R-TIME     1.70 * R-TIME     2.92 * R-TIME     2.42*
*IQ-TIME    0.55 * IQ-TIME    1.72 * IQ-TIME    0.70 * IQ-TIME   18.49 * IQ-TIME    1.38 * IQ-TIME    2.61 * IQ-TIME    2.15*
*E-TIME     0.32 * E-TIME     0.65 * E-TIME     0.28 * E-TIME     0.33 * E-TIME     0.32 * E-TIME     0.31 * E-TIME     0.26*
*OQ-TIME    0.11 * OQ-TIME    0.10 * OQ-TIME    1.11 * OQ-TIME    0.11 * OQ-TIME    0.32 * OQ-TIME    1.04 * OQ-TIME    0.01*
*DQ-TIME   11.30 * DQ-TIME    9.32 * DQ-TIME    3.00 * DQ-TIME   11.30 * DQ-TIME    7.08 * DQ-TIME    2.22 * DQ-TIME    0.01*
*************************************************************************************************************************
*      29       *       30      *               *               *               *               *               *
*#TRAN       379 * #TRAN    42,744 *               *               *               *               *               *
*A-RATE    0.003 * A-RATE    0.299 *               *               *               *               *               *
*R-TIME   217.39 * R-TIME     3.04 *               *               *               *               *               *
*IQ-TIME  217.11 * IQ-TIME    2.67 *               *               *               *               *               *
*E-TIME     0.28 * E-TIME     0.37 *               *               *               *               *               *
*OQ-TIME    0.11 * OQ-TIME    1.20 *               *               *               *               *               *
*DQ-TIME    5.30 * DQ-TIME    7.72 *               *               *               *               *               *
*************************************************************************************************************************

 TOTAL TRANSACTIONS     201,496    <12> AVG RESP TIME        6.57   AVG OP/Q TIME        0.61  <15>
 <11>                              <13> AVG IP/Q TIME        6.19   AVG D/Q TIME         6.28  <16>
                                   <14> AVG T/EL TIME        0.37   AVG A-RATE           0.173 <17>
```

Table 10-6 describes the report elements of the Response Time Calendar Report with the response option specified. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 10-6 Response Time Calendar Report Elements – with Response Option (Part 1 of 2)

<1> CURRENT DATE Date this report was generated, in mm/dd/yy format.
<2> title Name that identifies the type of report.
<3> month year Month and year of the response time data being reported.
<4> #TRAN Number of transactions processed on this day, excluding BMPs and JBPs.
<5> A-RATE Number of transactions that arrived on this day, divided by IMS uptime in seconds for this day (shown as hh:mm:ss in the System Availability Calendar Report E-TIME field).
<6> R-TIME Average transaction response time expended in seconds on this day, computed as `Total Daily Response Time in Seconds ÷ Number of Transactions that Generated a Response` Response time is defined as the time the original transaction appeared on queue until the time it was sent. For DBCTL threads and TPI, this field is zero.
<7> IQ-TIME Average input queue time in seconds for this day, computed as `Total Daily Input Queue Time in Seconds ÷ Number of Transactions Executed` **Note:** This time is not comparable to R-TIME if the transactions do not always generate a response. Input queue time is defined as the time the message arrived on queue until the time it was started. For DBCTL threads and TPI, this field is zero.
<8> E-TIME Average elapsed time in seconds for this day, computed as `Transaction Stop Time - Start Time ÷ Number of Transactions Executed`
<9> OQ-TIME Average output queue time in seconds for this day, computed as `Total Daily Output Queue Time ÷ Number of Messages Sent` Output queue time is defined as message insert time to message sent time. For DBCTL threads and TPI, this field is zero.

Table 10-6 Response Time Calendar Report Elements – with Response Option (Part 2 of 2)

<10> DQ-TIME Average dequeue time in seconds for this day, computed as `Total Daily Dequeue Time ÷ Number of Messages Dequeued` Dequeue time is defined as message sent time to message dequeue time.
<11> TOTAL TRANSACTIONS Total transactions that arrived during the month.
<12> AVG RESP TIME Average monthly response time in seconds, computed as `Total Response Time ÷ Actual Number of Transactions That Had Responses`
<13> AVG IP/Q TIME Average monthly input queue time in seconds, computed as `Total Input Queue Time ÷ Actual Number of Transactions That Had Responses`
<14> AVG T/EL TIME Average monthly elapsed time in seconds, computed as `Total Elapsed Time ÷ Actual Number of Transactions That Had Responses`
<15> AVG OP/Q TIME Average monthly output queue time in seconds, computed as `Total Output Queue Time ÷ Number of Messages Sent`
<16> AVG D/Q TIME Average monthly dequeue time in seconds, computed as `Total Dequeue Time ÷ Number of Messages Dequeued`
<17> AVG A-RATE Average transaction arrival rate for this month, computed as `Total Transaction Arrivals ÷ Total IMS Uptime`

Response Time Calendar Report – without Response Option

The Response Time Calendar Report, without response option, is produced when the IRUF file is created without IMS response time data (see the Log Edit chapter in the *MAINVIEW for IMS Offline – Customization and Utilities Guide*). The reported response time is INPUT QUEUE TIME + ELAPSED TIME.

Figure 10-9 shows an example of the Response Time Calendar Report without the response option selected.

Figure 10-9 Response Time Calendar Report – without Response Option

```
**** IMF ****                                IMS PERFORMANCE REPORTER                                **** IMF ****
CURRENT DATE - 03/22/yy          RESPONSE TIME CALENDAR REPORT (WITHOUT RESPONSE OPTION)
                                             JANUARY 20yy
*****************************************************************************************************************************
*   S U N D A Y   *   M O N D A Y   *   T U E S D A Y  *W E D N E S D A Y* T H U R S D A Y *   F R I D A Y   *S A T U R D A Y *
*****************************************************************************************************************************
*       1         *         2       *         3       *         4       *         5       *         6       *         7       *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*****************************************************************************************************************************
*       8         *         9       *        10       *        11       *        12       *        13       *        14       *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*****************************************************************************************************************************
*       15        *        16       *        17       *        18       *        19       *        20       *        21       *
*                 *                 *                 *                 *                 *                 * #TRAN      1,291*
*                 *                 *                 *                 *                 *                 * A-RATE     0.014*
*                 *                 *                 *                 *                 *              <1>* R-TIME     10.89*
*                 *                 *                 *                 *                 *              <2>* IQ-TIME    10.66*
*                 *                 *                 *                 *                 *                 * E-TIME      0.22*
*                 *                 *                 *                 *                 *              <3>*                *
*                 *                 *                 *                 *                 *              <3>*                *
*****************************************************************************************************************************
*       22        *        23       *        24       *        25       *        26       *        27       *        28       *
*#TRAN         108 * #TRAN     31,110 * #TRAN     35,066 * #TRAN     47,145 * #TRAN     20,448 * #TRAN     21,820 * #TRAN      1,385*
*A-RATE      0.000 * A-RATE      0.214 * A-RATE      0.274 * A-RATE      0.368 * A-RATE      0.292 * A-RATE      0.202 * A-RATE      0.015*
*R-TIME       0.87 * R-TIME       2.38 * R-TIME       0.99 * R-TIME      18.82 * R-TIME       1.70 * R-TIME       2.92 * R-TIME       2.42*
*IQ-TIME      0.55 * IQ-TIME      1.72 * IQ-TIME      0.70 * IQ-TIME     18.49 * IQ-TIME      1.38 * IQ-TIME      2.61 * IQ-TIME      2.15*
*E-TIME       0.32 * E-TIME       0.65 * E-TIME       0.28 * E-TIME       0.33 * E-TIME       0.32 * E-TIME       0.31 * E-TIME       0.26*
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*****************************************************************************************************************************
*       29        *        30       *                 *                 *                 *                 *                 *
*#TRAN         379 * #TRAN     42,744 *                 *                 *                 *                 *                 *
*A-RATE      0.003 * A-RATE      0.299 *                 *                 *                 *                 *                 *
*R-TIME    217.39 * R-TIME       3.04 *                 *                 *                 *                 *                 *
*IQ-TIME   217.11 * IQ-TIME      2.67 *                 *                 *                 *                 *                 *
*E-TIME       0.28 * E-TIME      0.37 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*                 *                 *                 *                 *                 *                 *                 *
*****************************************************************************************************************************

 TOTAL TRANSACTIONS     201,496         AVG RESP TIME        6.57                **********<4>
                                        AVG IP/Q TIME        6.19                **********<4>
                                        AVG T/EL TIME        0.37   AVG A-RATE           0.173
```

All fields on this report are the same as in the Response Time Calendar Report with the response option selected, except for the fields described in Table 10-7.

Table 10-7 describes the report elements of the Response Time Calendar Report without the response option selected. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 10-7 Response Time Calendar Report Elements – without Response Option

<1> R-TIME Average transaction response time expended in seconds on this day, computed as `Total Daily Response Time in Seconds ÷ Number of Transactions Executed` Response time is defined as input queue time plus elapsed time.
<2> IQ-TIME Average input queue time in seconds for this day, computed as `Total Daily Input Queue Time ÷ Number of Transactions Executed` Input queue time is defined as the time the original transaction arrived until the time it was started.
<3> OQ-TIME and DQ-TIME These averages do not exist for the Response Time Calendar Report (without response option). These times are carried on an IRUF only if it is generated *with* the response option specified.
<4> AVG OP/Q TIME and AVG D/Q TIME Monthly averages do not exist for the Response Time Calendar Report (without response option). These times are carried on an IRUF only if it is generated *with* the response option specified.

System Availability Calendar Report

DBCTL Threads:

DBCTL CICS and ODBA thread activity can be reported as follows:

- CICS=YES or CICS=OFFLINE must be specified for the Event Collector in BBPARM member IMFECP00.
- DBT=YES report control statement must be specified as described in “Keyword Statements” on page 10-36.
- Message region CPU time for DBCTL threads represents only the CPU time in processing the DL/I calls.
- Active DBCTL threads are included in the #MPP UP field.

Figure 10-10 shows an example of the System Availability Calendar Report.

Figure 10-10 System Availability Calendar Report

```
**** IMF ****                                IMS PERFORMANCE REPORTER                                **** IMF ****
CURRENT DATE - 03/22/yy <1>                SYSTEM AVAILABILITY CALENDAR REPORT <2>
                                                  JANUARY 20yy <3>
*****************************************************************************************************************************
*   S U N D A Y   *   M O N D A Y   *  T U E S D A Y  * W E D N E S D A Y* T H U R S D A Y *   F R I D A Y   *S A T U R D A Y *
*****************************************************************************************************************************
*        1        *         2        *         3        *         4        *         5        *         6        *         7       *
*                 *                  *                  *                  *                  *                  *                 *
*                 *                  *                  *                  *                  *                  *                 *
*                 *                  *                  *                  *                  *                  *                 *
*                 *                  *                  *                  *                  *                  *                 *
*                 *                  *                  *                  *                  *                  *                 *
*                 *                  *                  *                  *                  *                  *                 *
*                 *                  *                  *                  *                  *                  *                 *
*****************************************************************************************************************************
*        8        *         9        *        10        *        11        *        12        *        13        *        14       *
*                 *                  *                  *                  *                  *                  *                 *
*                 *                  *                  *                  *                  *                  *                 *
*                 *                  *                  *                  *                  *                  *                 *
*                 *                  *                  *                  *                  *                  *                 *
*                 *                  *                  *                  *                  *                  *                 *
*                 *                  *                  *                  *                  *                  *                 *
*                 *                  *                  *                  *                  *                  *                 *
*****************************************************************************************************************************
*       15        *        16        *        17        *        18        *        19        *        20        *        21       *
*                 *                  *                  *                  *                  *                  *<4>* E-TIME  25:12:39*
*                 *                  *                  *                  *                  *                  *<5>* %E-TIME    7.8%*
*                 *                  *                  *                  *                  *                  *<6>* C-TIME   0:00:51*
*                 *                  *                  *                  *                  *                  *<7>* #SESSIONS      2*
*                 *                  *                  *                  *                  *                  *<8>* #TERMS        15*
*                 *                  *                  *                  *                  *                  *<9>* #MPP UP        1*
*                 *                  *                  *                  *                  *                  *<10>* #BMP UP       0*
*****************************************************************************************************************************
*       22        *        23        *        24        *        25        *        26        *        27        *        28       *
*E-TIME  36:26:58 * E-TIME  40:18:28 * E-TIME  35:31:49 * E-TIME  35:30:19 * E-TIME  19:25:25 * E-TIME  29:56:26 * E-TIME  24:58:33*
*%E-TIME    11.3% * %E-TIME    12.5% * %E-TIME    11.0% * %E-TIME    11.0% * %E-TIME     6.0% * %E-TIME     9.2% * %E-TIME     7.7%*
*C-TIME   0:00:04 * C-TIME   0:17:45 * C-TIME   0:13:17 * C-TIME   0:28:24 * C-TIME   0:08:30 * C-TIME   0:10:16 * C-TIME   0:00:27*
*#SESSIONS      2 * #SESSIONS      2 * #SESSIONS      2 * #SESSIONS      2 * #SESSIONS      2 * #SESSIONS      2 * #SESSIONS      2*
*#TERMS         4 * #TERMS       266 * #TERMS       228 * #TERMS       245 * #TERMS       189 * #TERMS       177 * #TERMS        12*
*#MPP UP        0 * #MPP UP        8 * #MPP UP        7 * #MPP UP        7 * #MPP UP        7 * #MPP UP        6 * #MPP UP        0*
*#BMP UP        0 * #BMP UP        0 * #BMP UP        0 * #BMP UP        0 * #BMP UP        0 * #BMP UP        1 * #BMP UP        0*
*****************************************************************************************************************************
*       29        *        30        *                  *                  *                  *                  *                 *
*E-TIME  34:56:11 * E-TIME  39:42:09 *                  *                  *                  *                  *                 *
*%E-TIME    10.8% * %E-TIME    12.3% *                  *                  *                  *                  *                 *
*C-TIME   0:00:12 * C-TIME   0:17:51 *                  *                  *                  *                  *                 *
*#SESSIONS      2 * #SESSIONS      2 *                  *                  *                  *                  *                 *
*#TERMS         2 * #TERMS       322 *                  *                  *                  *                  *                 *
*#MPP UP        0 * #MPP UP        8 *                  *                  *                  *                  *                 *
*#BMP UP        0 * #BMP UP        0 *                  *                  *                  *                  *                 *
*****************************************************************************************************************************

  TOTAL ELAPSED TIME <11> 321:59:01   TOTAL SESSIONS <13> 20   AVG MPP'S UP   4.40 <14>
      TOTAL CPU TIME <12>   1:37:40                           AVG BMP'S UP   0.10 <15>
```

Table 10-8 describes System Availability Calendar Report elements. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 10-8 System Availability Calendar Report Elements (Part 1 of 2)

<1> CURRENT DATE Date this report was generated, in mm/dd/yy format.
<2> title Name that identifies the type of report.
<3> month year Month and year of the system availability data being reported.
<4> E-TIME Total elapsed time for IMS on this day in hh:mm:ss format. If an IMS session spans two days (processes past midnight) and separate IRUFs were not created, the total time is accounted for in the first day. If separate IRUFs were created for each day, but the IMS logs did not contain an IMS startup or shutdown record, MVIMS uses the timestamp of the earliest/latest log record to determine IMS elapsed time. For example, if IMS was up continuously, but no transaction activity occurred after 10:00 P.M., the elapsed time would be 22 hours, not 24 hours.
<5> %E-TIME Percentage of total IMS elapsed time for this day, computed as `(Daily Elapsed Time ÷ Monthly Elapsed Time) × 100`
<6> C-TIME+ Total CPU time used by the system on this day. A plus sign in this field indicates that DB2 CPU time is included. For more information, see “CPU Timing” on page 2-7.
<7> #SESSIONS Number of IMS sessions started on this day. If a user runs IMFLEDIT more frequently than IMS (for example, IMFLEDIT is run when the IMS LOG is archived), this field does not reflect the number of IMS sessions. Instead, it reflects the number of IMFLEDIT runs for the day.
<8> #TERMS Number of LTERMs that submitted transactions on this day.
<9> #MPP UP Number of uniquely named message processing regions (MPP and JMP) that were active on this day. This number includes Fast Path message-driven regions and DBCTL threads.
<10> #BMP UP Number of unique batch message regions (BMP and JBP) that were active on this day. This value includes Fast Path non-message-driven and Fast Path utility regions.
<11> TOTAL ELAPSED TIME Total monthly elapsed time in hhh:mm:ss, computed as sum of daily elapsed times.

Table 10-8 System Availability Calendar Report Elements (Part 2 of 2)

<12> TOTAL CPU TIME Total monthly CPU time in hhh:mm:ss, computed as sum of daily total CPU time. For more information, see “CPU Timing” on page 2-7.
<13> TOTAL SESSIONS Total number of IMS sessions for this month, computed as the sum of daily number of sessions.
<14> AVG MPP’S UP Average number of message processing regions (MPP and JMP) up for this month, computed as `Total MPPs/JMPs for the Month ÷ Actual Number of Days in the Month the System Was Available` This value includes Fast Path message-driven regions (MDP) and DBCTL threads.
<15> AVG BMP’S UP Average number of batch message regions (BMPs and JBPs) up for the month, computed as `Total BMPs/JBPs for the Month ÷ Actual Number of Days in the Month the System Was Available` This value includes Fast Path non-message-driven (NDP) and Fast Path utility (FPU) regions.

System CPU Time Calendar Report

Figure 10-11 provides an example of the System CPU Time Calendar Report.

Figure 10-11 System CPU Time Calendar Report

```
**** IMF ****                                IMS PERFORMANCE REPORTER                                **** IMF ****
CURRENT DATE - 03/22/yy <1>                SYSTEM CPU TIME CALENDAR REPORT <2>
                                                 JANUARY 20yy <3>
*****************************************************************************************************************************
*   S U N D A Y   *   M O N D A Y   *   T U E S D A Y  * W E D N E S D A Y* T H U R S D A Y *   F R I D A Y   *S A T U R D A Y *
*****************************************************************************************************************************
*       1       *       2       *       3       *       4       *       5       *       6       *       7       *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*****************************************************************************************************************************
*       8       *       9       *       10      *       11      *       12      *       13      *       14      *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*****************************************************************************************************************************
*       15      *       16      *       17      *       18      *       19      *       20      *       21      *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*               *               *               *               *               *               *               *
*****************************************************************************************************************************
*       22      *       23      *       24      *       25      *       26      *       27      *       28      *
*C-TIME     4.81  * C-TIME  1065.13  * C-TIME   797.16  * C-TIME  1704.24  * C-TIME   510.27  * C-TIME   616.34  * C-TIME    27.44 *
*%C-TIME     0.0  * %C-TIME    18.1  * %C-TIME    13.6  * %C-TIME    29.0  * %C-TIME     8.7  * %C-TIME    10.5  * %C-TIME     0.4 *
*%DLI-TIME   5.9  * %DLI-TIME  26.1  * %DLI-TIME  39.2  * %DLI-TIME  24.8  * %DLI-TIME  39.4  * %DLI-TIME  39.6  * %DLI-TIME  32.4 *
*%B/H-TIME   0.0  * %B/H-TIME   0.0  * %B/H-TIME   0.0  * %B/H-TIME   0.0  * %B/H-TIME   0.0  * %B/H-TIME   0.0  * %B/H-TIME   0.0 *
*%A/P-TIME  94.0  * %A/P-TIME  73.1  * %A/P-TIME  59.8  * %A/P-TIME  74.0  * %A/P-TIME  60.3  * %A/P-TIME  60.0  * %A/P-TIME  67.5 *
*%P/S-TIME   0.0  * %P/S-TIME   0.0  * %P/S-TIME   0.0  * %P/S-TIME   0.0  * %P/S-TIME   0.0  * %P/S-TIME   0.0  * %P/S-TIME   0.0 *
*%O/H-TIME   0.1  * %O/H-TIME   0.8  * %O/H-TIME   1.0  * %O/H-TIME   1.2  * %O/H-TIME   0.3  * %O/H-TIME   0.4  * %O/H-TIME   0.1 *
*****************************************************************************************************************************
*       29      *       30      *               *               *               *               *               *
*C-TIME    12.23  * C-TIME  1071.12  *               *               *               *               *               *
*%C-TIME     0.2  * %C-TIME    18.2  *               *               *               *               *               *
*%DLI-TIME   8.1  * %DLI-TIME  43.5  *               *               *               *               *               *
*%B/H-TIME   0.0  * %B/H-TIME   0.0  *               *               *               *               *               *
*%A/P-TIME  91.8  * %A/P-TIME  55.8  *               *               *               *               *               *
*%P/S-TIME   0.0  * %P/S-TIME   0.0  *               *               *               *               *               *
*%O/H-TIME   0.1  * %O/H-TIME   0.7  *               *               *               *               *               *
*****************************************************************************************************************************
        <11>                    <12>                <14>                    <16>
  TOTAL CPU USAGE      5,860.26  % P/SCH CPU   0.0  % BUFF/HNDLR CPU   0.0  % A/PROG CPU    65.9
  IN SECONDS                     % DLI CPU    33.3  % DB2 CPU          0.0  % OVERHEAD CPU   0.8
                                 <13>               <15>                    <17>
```

Table 10-9 describes System CPU Time Calendar Report elements. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 10-9 System CPU Time Calendar Report Elements (Part 1 of 2)

<1>	**CURRENT DATE** Date this report was generated, in mm/dd/yy format.
<2>	**title** Name that identifies the type of report.
<3>	**month year** Month and year of the system CPU time data being reported.
<4>	**C-TIME+** Total CPU time used on this day. A plus sign in this field indicates that DB2 CPU time is included. For more information, see “CPU Timing” on page 2-7.
<5>	**%C-TIME** Percentage of total CPU time for this day, computed as `(Daily CPU Time ÷ Monthly CPU Time) × 100`
<6>	**%DLI-TIME+** Percentage of total DL/I CPU time for this day. A plus sign in this field indicates that DB2 CPU time is included. This percentage is computed as `(Message Region DL/I CPU Times + Message Region DB2 CPU times + Control Region DL/I CPU Times ÷ Total Daily CPU Time) × 100`
<7>	**%B/H-TIME** Percentage of total buffer handler CPU time for this day, computed as `(Message Region Buffer Handler CPU Time + Control Region Buffer CPU Times ÷ Total Daily CPU Time) × 100`
<8>	**%A/P-TIME** Percentage of application program CPU time for this day, computed as `(Application Program CPU Time ÷ Total Daily CPU Time) × 100`
<9>	**%P/S-TIME** Percentage of program scheduling CPU time for this day, computed as `(Program Scheduling CPU Time ÷ Total Daily CPU Time) × 100`
<10>	**%O/H-TIME** Percentage of overhead CPU time for this day, computed as `100 - (% DL/I CPU Time + % Buffer Handler CPU Time + % Application Program CPU Time + % Program Scheduling CPU Time)`
<11>	**TOTAL CPU USAGE IN SECONDS** Monthly CPU usage computed as the sum of daily CPU usage.

Table 10-9 System CPU Time Calendar Report Elements (Part 2 of 2)

<12> % P/SCH CPU Monthly percentage of program scheduling CPU usage, computed as `(Sum of Daily Program Scheduling Times ÷ Total CPU Times) × 100`
<13> % DL/I CPU Monthly percentage of DL/I CPU usage, computed as `(Sum of Daily DL/I CPU Times ÷ Total CPU Times) × 100`
<14> % BUFF/HNDLR CPU Monthly percentage of buffer handler CPU usage, computed as `(Sum of Daily Buffer Handler CPU Times ÷ Total CPU Times) × 100`
<15> % DB2 CPU Monthly percentage of DB2 CPU usage, computed as `(Sum of Daily DB2 CPU Times ÷ Total CPU Times) × 100`
<16> % A/PROG CPU Monthly percentage of application program CPU usage, computed as `(Sum of Daily Application Program CPU Time ÷ Total CPU Times) × 100`
<17> % OVERHEAD CPU Monthly percentage of overhead CPU usage, computed as `100 - (Total DL/I % + Total Buffer Handler % + Total Application Program % + Total Program Scheduling)`

Note: See “CPU Timing” on page 2-7 for more information about the CPU times in the report.

Job Control Statements

This section describes the JCL statements required to execute the PRSCLNDR program. Figure 10-12 on page 10-34 provides a JCL example.

Table 10-10 PRSCLNDR JCL Statements

Statement	Function
JOB	Initiates the job.
EXEC	Specifies the program name of the calendar report process as PGM=PRSCLNDR Also specifies the region required, which can be affected by • block size of the IRUF • number of buffers specified for the data sets
STEPLIB DD	Defines the program library (IMF.LOAD) that contains the PRSCLNDR program load module.

RESUTIL DD	Defines the IRUF used as the input to the program. The data set DCB attributes are RECFM=VBS,LRECL=30970,BLKSIZE=30974.
	Multiple files can be concatenated. For example, to produce reports for the first three months in a year, RESUTIL can be concatenated as follows:
	`//RESUTIL DD DSN=IRUF.JANUARY,DISP=OLD`
	`// DD DSN=IRUF.FEBRUARY,DISP=OLD`
	`// DD DSN=IRUF.MARCH,DISP=OLD`
	Usually, only the daily IRUF records for a month are needed as input to PRSCLNDR.

CTLPRINT DD	Defines the data set to contain an image of the valid report selection parameters RECFM=FBA,LRECL=133. BLKSIZE must be specified explicitly.
ERRORS DD	Defines the data set to contain diagnostic messages documenting control statement edit errors and any unusual errors detected while data is being gathering from the IRUF for calendar reports. The data set characteristics are RECFM=FB,LRECL=133. BLKSIZE must be specified explicitly.
CALREPTS DD	Defines the data set to contain the calendar-like reports generated as specified by user-written report control statements. The data set characteristics are RECFM=FB,LRECL=133. BLKSIZE must be specified explicitly.
CALSELEC DD	Defines report control statements, which are described on page 10-34. If the DSN parameter is used to define the data set, the characteristics of the data set are RECFM=FB,LRECL=80.
SYSOUT DD	Defines the data set used to display the final totals at end of job.

Figure 10-12 provides an example of JCL for PRSCLNDR.

Figure 10-12 Sample JCL for PRSCLNDR

```
//JOBNAME  JOB  ............
//STEP1    EXEC PGM=PRSCLNDR,REGION=512K
//STEPLIB  DD   DSN=IMF.LOAD,DISP=SHR
//RESUTIL  DD   DSN=IRUF.DAY1,DISP=OLD,
//              DCB=(RECFM=VBS,LRECL=30970,BLKSIZE=30974)
//         DD   DSN=IRUF.DAY2,DISP=OLD,
//              DCB=(RECFM=VBS,LRECL=30970,BLKSIZE=30974)
//         DD   DSN=IRUF.DAY3,DISP=OLD
//              DCB=(RECFM=VBS,LRECL=30970,BLKSIZE=30974)
//CTLPRINT DD   SYSOUT=A,DCB=BLKSIZE=133
//ERRORS   DD   SYSOUT=A,DCB=BLKSIZE=133
//CALREPTS DD   SYSOUT=A,DCB=BLKSIZE=133
//CALSELEC DD   *
CALTRAN,01yy
CALTERM,02yy
CALPROG,01yy
CALDB  ,02yy
CALRESP,01yy
DBT=YES
TPI=YES
/*
//SYSOUT   DD   SYSOUT=A
//
```

Report Control Statements

You can use report control statements to request one report, any combination of reports, or all calendar reports in a single PRSCLNDR execution. No specific input sequence is required and there are no default reports.

The two types of control statements, positional and keyword, are described in the following sections.

Positional Statements:

The statement position defines the type of report and specifies the month (or months) and the year to be reported. The IRUF input must contain the month and year data specified in the control statements.

Table 10-11 on page 10-35 shows positional statement syntax for PRSCLNDR.

Table 10-11 Positional Statement Syntax – Calendar Reports

Position	Input
01 – 03	Program code: CAL
04 – 07	Report Code: TRAN | PROG | TERM | DB | DB2 | RESP | SYSA | SYSC | ALL
08	Comma or blank
09 – 12	Month and year selection field 1 • The value XXXX selects the date field from the first IRUF record read. • The format **_yy_ specifies all months in a year, where _yy_ is the numeric value for the last two digits of the year. • The format _mmyy_ specifies one month, where _mm_ is the numeric value for the month and _yy_ is the numeric value for the last two digits of the year. When a specific month is selected, additional months and month ranges can be specified in subsequent statement fields.
13	Comma, blank, or dash (dash used between months in a range)
14 – 17	Month and year selection field 2 (same format at selection field 1)
18	Comma, blank, or dash (dash used between months in a range)
19 – 22	Month and year selection field 3 (same format at selection field 1)
23	Comma, blank, or dash (dash used between months in a range)
24 – 27	Month and year selection field 4 (same format at selection field 1)
28	Comma, blank, or dash (dash used between months in a range)
29 – 32	Month and year selection field 5 (same format at selection field 1)
33	Comma, blank, or dash (dash used between months in a range)
34 – 37	Month and year selection field 6 (same format at selection field 1)
38	Comma, blank, or dash (dash used between months in a range)
39 – 42	Month and year selection field 7 (same format at selection field 1)
43	Comma, blank, or dash (dash used between months in a range)
44 – 47	Month and year selection field 8 (same format at selection field 1)
48	Comma, blank, or dash (dash used between months in a range)
49 – 52	Month and year selection field 9 (same format at selection field 1)
53	Comma, blank, or dash (dash used between months in a range)
54 – 57	Month and year selection field 10 (same format at selection field 1)
58	Comma, blank, or dash (dash used between months in a range)
59 – 62	Month and year selection field 11 (same format at selection field 1)
63	Comma, blank, or dash (dash used between months in a range)
64 – 67	Month and year selection field 12 (same format at selection field 1)

Keyword Statements:

The DBT keyword statement specifies whether DBCTL threads are included in the calendar reports. The TPI keyword statement specifies whether TPI transactions are included in the calendar reports.

Table 10-12 shows keyword statement syntax for PRSCLNDR.

Table 10-12 Keyword Statement Syntax – Calendar Reports

Position	Input
01 – 04	DBT= | TPI=
05 – 07	YES | NO YES specifies to include DBCTL threads or TPI transactions from the calendar reports (the default).

If DBT=YES is specified to include DBCTL threads, you should keep the following considerations in mind when you examine the reports for historical trends.

- **Input queue time.** Zero is used for DBCTL threads, which tends to lower the averages for non-DBCTL transactions if DBCTL threads are included.

- **Elapsed time.** If you have conversational CICS transactions, they tend to raise the average elapsed time and response time.

- **Response time.** If you generated the IRUF with the response option, the response time for DBCTL threads is zero, which tends to lower the averages for non-DBCTL transaction response time if the DBCTL threads are included.

- T**erminal-related data.** Message queue and character counts are zero for DBCTL transactions, which lowers the averages for non-DBCTL transactions in these reports if DBCTL threads are included.

- **CPU time.** CPU time for DBCTL threads is the time spent processing the DL/I requests, which tends to lower the CPU time-related averages for non-DBCTL transactions if DBCTL transactions are included.

- **System Availability Calendar Report.** Active DBCTL threads are included in the #MPP UP field.

If TPI=YES is specified to include TPI transactions, TPI transactions are similar to DBCTL threads in that they have no input queue time, response time, or terminal-related data.

Control Statement Report Codes

The valid report codes for positions 04 to 07 of a PRSCLNDR control statement are as follows:

Code	Description
TRAN	Transaction Calendar Report
PROG	Program Calendar Report
TERM	Terminal Calendar Report
DB	Database Calendar Report
DB2	DB2 Transaction Calendar Report
RESP	Response Time Calendar Report (with response option or without response option) The report that is produced is determined by the Log Edit response option (see the *MAINVIEW for IMS Offline – Customization and Utilities Guide*).
SYSA	System Availability Calendar Report
SYSC	System CPU Time Calendar Report
ALL	All calendar reports

Control Statement Examples

The following examples show how the PRSCLNDR control statements can be used.

CALTRAN,01yy,03yy,04yy,10yy Produces the Transaction Calendar Report for January, March, April, and October of 20yy.
CALPROG,**yy Produces the Program Calendar Report for all 12 months in 20yy.
CALTERM,06yy-11yy Produces the Terminal Calendar Report for June 20yy through November 20yy.
CALDB,02yy,04yy-10yy Produces the Database Calendar Report for February and April through October 20yy.
CALRESP,01yy,02yy,03yy,04yy,05yy,06yy,07yy,08yy,09yy,10yy,11yy,12yy DBT=YES or CALRESP, **yy DBT=YES Produces the Response Time Calendar Report for January through December 20yy. The report includes DBCTL threads (DBT=YES).
CALSYSA,01yy,03yy-06yy,08yy,10yy-12yy Produces the System Availability Calendar Report for January, March through June, August, and October through December 20yy.
CALSYSC,06yy Produces the System CPU Time Calendar Report for June 20yy.
CALALL ,12yy Produces all the calendar reports for December 20yy.
CALALL ,**yy Produces all the calendar reports for all 12 months in 20yy. If the CALALL control statement is used, it must be the only parameter specified for PRSCLNDR execution, because all the reports are produced for the time span specified.

Diagnostic Reports

Each valid control statement is printed in the Report Request Selection Trace report, shown in Figure 10-13. Any statement diagnostics are located in the PRSCLNDR Edit Error report, shown in Figure 10-14 on page 10-40.

All control statements must be error free before any calendar reports can be produced. A return code 040 indicates that control statement errors were found and that the program has been terminated. A list of statement errors and possible causes is provided in “Error Messages” on page 10-41.

Request Selection Trace Report

The Report Request Selection Trace report lists the input to PRSCLNDR and summarizes the execution results.

Figure 10-13 provides an example of the report.

Figure 10-13 Report Request Selection Trace Report

```
**** IMF ****                          IMS PERFORMANCE REPORTER                          **** IMF ****
  CURRENT DATE - 03/22/yy <1>       REPORT REQUEST SELECTION TRACE <2>                     PAGE NO. 1
                   CALALL ,01yy <3>
```

Table 10-13 describes Report Request Selection Trace report elements. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 10-13 Report Request Selection Trace Report Elements

<1> CURRENT DATE	Date this report was generated, in mm/dd/yy format.
<2> title	Name that identifies the type of report.
<3> control statement	User-specified control statements that requested the report.

PRSCLNDR Edit Error Report Element Description

The PRSCLNDR Edit Error Report lists control statement errors found by PRSCLNDR.

Figure 10-14 provides an example of the report.

Figure 10-14 PRSCLNDR Edit Error Report

```
**** IMF ****                          IMS PERFORMANCE REPORTER                                    **** IMF ****
 CURRENT DATE - 03/22/yy <1>           PRSCLNDR EDIT ERROR REPORT <2>                              PAGE NO.   1
CALTANN,010X <3>                                        INVALID SELECTION ID SPECIFIED  <4>
                                                        INVALID SELECTION YEAR SPECIFIED
CALTANN,04yy-04-yy                                      INVALID SELECTION ID SPECIFIED
                                                        INVALID DATE DELIMITER FOUND
                                                        INVALID SELECTION MONTH SPECIFIED
                                                        INVALID SELECTION YEAR SPECIFIED
                                                        RANGE THRU DATE INVALID
CALRESP,X1yy                                            INVALID SELECTION MONTH SPECIFIED
                                                        *** REPORTS SUPPRESSED - EDIT ERRORS FOUND ***
```

Table 10-14 describes PRSCLNDR Edit Error Report elements. The reference numbers (with the **<n>** format) match the elements in the report example pages to the elements described in the table.

Table 10-14 PRSCLNDR Edit Error Report Elements

<1>	**CURRENT DATE** Date this report was generated, in mm/dd/yy format.
<2>	**title** Name that identifies the type of report.
<3>	**control statement** Control statement (or statements) in error.
<4>	**error messages** Error that was encountered during processing of the control statement. If there is more than one error per control statement, the errors are listed on multiple lines for the same control statement. The message `*** REPORTS SUPPRESSED - EDIT ERRORS FOUND ***` is always the last message and always accompanies return code 040. After reporting the error, the program terminates.

Error Messages

If any of the following edit error messages occur, correct the problem as required and resubmit the job request.

ONLY ONE ALL MONTHS FOR YEAR REQUEST ALLOWED

For instance, **yy,**yy might have been entered in the same control statement. Only one ** is allowed because it translates to 12 months, which is the maximum allowed.

ONLY ONE MMYY DATE CAN BE SPECIFIED FOR CALALL

Only one mmyy request can be made for CALALL.

PARAMETER ALREADY SPECIFIED - SECOND ONE IGNORED

Two control statements with the same identifier were found. Identifiers must be unique to a given run.

RANGE FROM DATE INVALID

An invalid mm or yy date was detected in a range.

RANGE SPECIFIES MORE THAN 12 REPORT MONTHS

A from and through date range covers more than 12 months. A maximum of 12 months is allowed.

RANGE THRU DATE INVALID

An invalid mm or yy date was detected in a range.

RANGE THRU DATE MUST BE GREATER THAN FROM DATE

A range of dates was specified with the start date greater than the end date.

*** REPORTS SUPPRESSED - EDIT ERRORS FOUND ***

Printed as the last message if any edit errors are found (accompanies return code 040).

DUPLICATE RANGE

Duplicate selection dates were found.

DUPLICATE SELECTION DATE FOUND

A duplicate mmyy was detected in the same control statement. The selection date must be unique.

FIRST DATE DELIMITER MUST NOT BE A DASH

Column 13 is first valid location for a dash.

INVALID DATE DELIMITER FOUND

A value other than a comma, a blank, or a dash was detected.

INVALID IRUF RECORD FOUND

An IRUF record type other than L, P, or T was encountered.

INVALID SELECTION ID SPECIFIED

An invalid report code was specified (see “Control Statement Report Codes” on page 10-37 for the valid codes).

INVALID SELECTION MONTH SPECIFIED

A value other than 01 through 12 was detected.

INVALID SELECTION YEAR SPECIFIED

A nonnumeric year was detected.

MORE THAN 12 REPORT MONTHS

A maximum of 12 report months can be specified for a single PRSCLNDR execution.

NO IRUF RECORDS SELECTED; REPORTS NOT GENERATED

None of the records on IRUF file matched mmyy specified in control statements; accompanies return code 044.

NO SELECTION DATE PARAMETERS WERE FOUND

All mmyy parameters were blank for the control statement shown.

*** NO SELECTION PARAMETERS FOUND - RESUBMIT JOB ***

No report selection requests were detected. Run terminated with return code 036.

Return Codes

The following return codes indicate the results of PRSCLNDR execution.

Code	Explanation
036	No selection parameters were submitted. Resubmit the job with valid control statements.
040	Control statement edit errors were detected. Consult the PRSCLNDR Edit Error Report for required information and resubmit the run.
044	No IRUF records met report requests. Either change report selection parameter dates or provide a new IRUF input file.

Appendix A How Product Libraries Should be Used

Several distributed libraries are included with your MAINVIEW products, including a parameter library (BBPARM), a sample library (BBSAMP), and a profile library (BBPROF). Use the contents of these distributed libraries as models to create site-customized product libraries, either manually or automatically, with AutoCustomization.

Warning! The distributed libraries should never be modified. If you change the distributed libraries, subsequent SMP maintenance will overwrite your changes.

Throughout the MAINVIEW documentation set, references to these libraries use the distributed name. However, when you need to make changes, be sure to use the corresponding library that has been customized for your site. Table A-1 lists the distributed name, the corresponding customized library created by AutoCustomization, and leaves space for you to note any other corresponding library that may have been created for your site.

Table A-1 Product Libraries

Distributed Library Name	Library Created by AutoCustomization	Other Site-Customized Copy
BBPARM	UBBPARM	
BBSAMP	UBBSAMP	
BBPROF	SBBPROF	

For more detailed information about all the product libraries, see “Using MAINVIEW Product Libraries” in the *MAINVIEW Common Customization Guide* or “Using Product Libraries” in the *MAINVIEW Administration Guide*.

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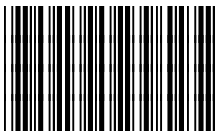

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